



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

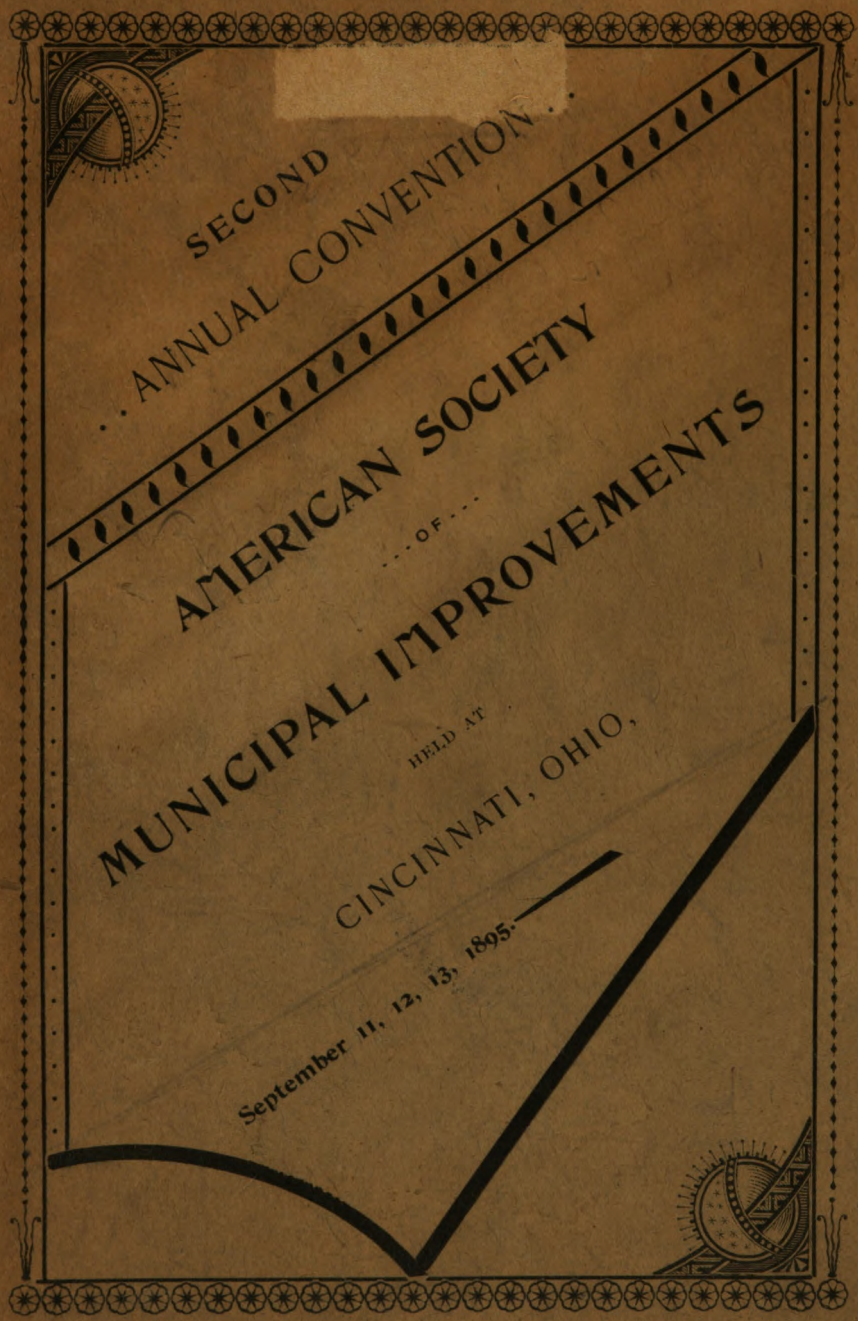
About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

70
/ .A52

JUN 20 1890

M 18 01



SECOND
.. ANNUAL CONVENTION ..

AMERICAN SOCIETY
... OF ...
MUNICIPAL IMPROVEMENTS

HELD AT
CINCINNATI, OHIO,
September 11, 12, 13, 1895.



Mr 18 '37

PROCEEDINGS

OF THE

SECOND ANNUAL CONVENTION

OF THE

American Society of Municipal Improvements

HELD AT

CINCINNATI, OHIO,

SEPTEMBER 11, 12, AND 13, 1895.

CINCINNATI:

THE COMMERCIAL GAZETTE JOB PRINT.

1895.

OFFICERS 1894-1895.

PRESIDENT :

M. J. MURPHY, St. Louis, Mo.

FIRST VICE-PRESIDENT :

G. H. BENZENBERG, Milwaukee, Wis.

SECOND VICE-PRESIDENT :

GEORGE S. GATCHELL, Buffalo, N. Y.

SECRETARY :

D. L. FULTON, Allegheny, Pa.

TREASURER :

A. JORALEMAN, Newark, N. J.

THE AMERICAN SOCIETY

OF

MUNICIPAL IMPROVEMENTS.

During the summer of 1894 Mr. M. J. Murphy, Street Commissioner of St. Louis, Mo., sent out a number of letters to mayors, boards of public works, and other officers having the supervision or control of municipal departments or works throughout the country, suggesting the idea of forming a society, to meet annually, for the purpose of discussing improved methods pertaining to the particular departments over which they may have supervision or control. A large number of favorable responses were received, and Mr. Murphy opened up another correspondence with a view of determining where the first gathering should be held. A majority of the replies favored Buffalo, N. Y. The Common Council of that city adopted a resolution, which was approved by the Mayor, extending an invitation to hold the first meeting in that city. They also appointed a committee of twenty-five citizens to make the necessary arrangements to entertain the guests in case the invitation was accepted. Mr. Murphy issued the call, to meet in Buffalo on September 19, 1894, and in response thereto about sixty representatives of various municipal departments, representing some thirteen cities, assembled at that time and organized this society. To Mr. Murphy, of St. Louis, the title of father of the society, therefore, applies.

Second Annual Convention.

The following gentlemen attended the Buffalo Convention :

FORT WAYNE, IND.

THOS. D. DEVILBISS....Chairman Board of Public Works.
 WILLIS HATTERSLEY. . .Member Board of Public Works.
 G. H. LOESCH.....Councilman.
 W. TIGAR " "
 CHAS. GRIEBEL. " "
 P. WOLF " "
 P. J. SCHEID " "
 B. BARKENSTERN..... " "
 H. MICHAEL.....Ex-Councilman.
 F. M. RANDALL. City Engineer.
 F. J. MILLER.....
 GEO. REITER.....
 C. H. WALTERMATH....
 A. FUELBER.....Newspaper Representative.
 O. E. MOEHLER " "
 O. L. DRUMMOND " "

NEW HAVEN, CONN.

J. B. SERGEANT Mayor.
 J. M. STATES.....President Board of Public Works.
 WM. MALEY.....Member Board of Public Works.
 J. E. MCGANN..... " " "
 JAS. BISHOP " " "
 P. DOYLE " " "
 C. W. KELLYCity Engineer.

ALLEGHENY, PA.

D. L. FULTON.....Superintendent of Highways and Sewers.

GRAND RAPIDS, MICH.

F. E. LETELLIER.....President Board of Public Works.
 A. E. WORDEN..... Member Board of Public Works.
 J. J. MCVEAN..... " " "
 H. A. COLLAR.....City Engineer.

MILWAUKEE, WIS.

G. H. BENZENBERGCity Engineer and Pres't Board Public Works.
 F. SCHNEIDER.....Commissioner Board of Public Works.
 E. M. SCHEUNGEL " " "
 SAM BROCKMAN..... " " "

BUFFALO, N. Y.

GEN. GEO. S. FIELDS...President Board of Public Works.
 GEO. S. GATCHELL.....Commissioner Board of Public Works.
 JAMES MOONEY..... " " "
 R. G. PARSONS.....Secretary Board of Public Works.

LOCKPORT, N. Y.

CHAS. G. HILDRETH....Secretary of the Holly Manufacturing Co.

NEW BEDFORD, MASS.

SAVORY C. HATHAWAY...Member Board of Public Works.

A. B. DRAKE.....Superintendent of Streets.

ST. LOUIS, MO.

ROBERT E. MCMATH...President Board of Public Improvements.

R. R. SOUTHARDSewer Commissioner.

CAMDEN, N. J.

L. E. FARNHAM.....City Engineer.

JOHN BLOWE.....Street Commissioner.

OMAHA, NEB.

J. H. WINSPEARChairman Board of Public Works.

ST. A. D. BALCOMBE....Sewer Commissioner.

F. J. KASPAR.....Street Commissioner.

INDIANAPOLIS, IND.

A. KRAMERMember Board of Public Works,

MEMPHIS, TENN.

P. C. POWERS.....Street Commissioner.

NEWARK, N. J.

HARRISON VAN DUYN.E. President Board of Public Works.

A. JORALEMAN..... Member Board of Public Works.

SYRACUSE, N. Y.

H. B. JOHNSON.....Commissioner Board of Public Works.

PORTLAND, ME.

G. N. FERNALDCity Engineer.

CINCINNATI, O.

AUGUST HERRMANN....President Board of Administration.

GEO. F. STERRITTMember Board of Administration.

JOHN B. WASHBURN.... " " "

JOHN FREY..... " " "

D. W. BROWN.....City Auditor.

After an address of welcome by the Mayor of Buffalo a Committee on Permanent Organization, consisting of the following gentlemen, was appointed:

Geo. T. Sterritt, Cincinnati, O.	A. J. Joraleman, Newark, N. J.
Geo. H. Benzenberg, Milwaukee, Wis.	P. C. Powers, Memphis, Tenn.
F. Letellier, Grand Rapids, Mich.	Andrew Kramer, Indianapolis, Ind.
D. L. Fulton, Allegheny, Pa.	J. H. Winspear, Omaha, Neb.
Jas. M. States, New Haven, Conn.	John Blowe, Camden, N. Y.
T. D. DeVilbiss, Fort Wayne, Ind.	R. R. Southard, St. Louis, Mo.
G. H. Fernald, Portland, Me.	S. C. Hathaway, New Bedford, Mass.
H. B. Johnson, Syracuse, N. Y.	Geo. S. Gatchell, Buffalo, N. Y.

Second Annual Convention.

This committee reported the following constitution and by-laws at the evening session of the convention, which were unanimously adopted :

OBJECT.

The object of this society, which shall be known as "THE AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS," is to promote information upon and to discuss the best methods to be employed in the management of all municipal departments and the construction of municipal works, by means of annual conventions for social intercourse, and the reading and discussion of papers upon municipal improvements, and to circulate, by means of annual publication, among its members the information thus obtained.

MEMBERSHIP.

The municipalities of this country, and its officers who have charge or supervision of municipal departments or works, shall be eligible to membership in this society.

ADMISSION FEE.

Each municipality may become a member of this society by payment of five dollars for each delegate to the annual convention, and each individual who is eligible to membership upon payment of five dollars.

DUES.

The dues for each member or individual representative shall be three dollars per annum, payable on or before the date of the annual meeting.

OFFICERS.

The officers of this society shall consist of a President, two Vice-presidents, a Secretary, and a Treasurer, who shall act as an executive committee for and in behalf of the society.

ELECTION OF OFFICERS.

The officers of this society shall be elected on the second day of each annual convention, and each municipality shall be entitled to as many votes as it has representatives present.

MEETINGS.

The annual meeting of this society shall be held on the second Wednesday of September of each year, in such city as the majority vote of its members shall decide. Selection of place of meeting to be made after the officers shall have been elected.

AMENDMENTS.

These rules may be amended at any annual convention by a two-third vote of all members voting.

Thereupon permanent officers were elected for the year, as follows: M. J. Murphy, of St. Louis, Mo., President; G. H. Benzenberg, of Milwaukee, Wis., First Vice-president; George S. Gatchell, of Buffalo, N. Y., Second Vice-president; D. L. Fulton, of Allegheny, Pa., Secretary; A. Joraleman, of Newark, N. J., Treasurer.

The cities represented were then called in their alphabetical order for such suggestions as their delegates desired to present. It was at once seen that an interchange of views, as could be had in annual conventions of this kind, would be productive of much good and benefit to the cities represented in these conventions, and, to use the language of one of the members, "more information could be gathered in two or three days' sessions of this kind than in a whole year's correspondence."

The permanent officers of the convention were then appointed an executive committee to draft a more complete set of articles and by-laws, to be submitted for the consideration of the society at its next annual session.

After quite a spirited contest Cincinnati was chosen as the location for the next annual convention.

Mr. Aug. Herrmann, representing the Board of Administration of Cincinnati, presented the following paper:

MR. CHAIRMAN AND GENTLEMEN:

I presume that the majority of cities that are represented at this convention are in much the same position as Cincinnati; that is to say, they came here to assist in perfecting a permanent organization of the various municipal boards of the country, and not to discuss any particular subject at this time. We heartily indorse this movement, and believe that at future gatherings of this kind, when papers on certain subjects can be arranged and prepared in anticipation of such conventions, much can be learned which will be not only of interest to ourselves, but of great importance to the people and cities which we may represent. As I have stated, the board which I have the honor to represent is not here to-day with any pre-arranged papers or subjects for discussion. At the suggestion of my colleagues, however, I have hurriedly prepared a statement with reference to the purchasing of materials and supplies, a department recently established in our city under the direct control of the Board of Administration.

There is, perhaps, more power centralized in our board than in any board of its kind in the country. We have entire control of no less than eight separate and distinct departments — to-wit: Office Department, where all of the official business of the board is transacted, and where all

improvement legislation must originate; the Engineer's Department, which controls all construction work pertaining to streets, sewers, bridges, etc.; Waterworks, Health Department, Parks, Street-Cleaning and Repairing departments, and the City Infirmary Department. Our purpose in calling attention to this is the fact that it naturally follows that material and supplies necessary for maintaining these departments in a city as large as Cincinnati must necessarily be very great.

We have recently established what we have termed a General Purchasing Agency for the various departments under our control. Heretofore all purchases were made by the head or some subordinate in charge of each department; there was no general system in vogue. A great number of purchases were made without any competition at all, and instances could be cited where purchases were made for no other reason than that the persons from whom the same were made were friendly to the person authorized to make the purchases; again, because it was simply a matter of favoritism. This agency was temporarily established about six months ago, in order that the practicability of adopting a thorough system in the purchase of supplies and materials of every kind necessary for the operation of the various departments under control of the board could be intelligently considered and determined before it was permanently established. While only temporary provision was made for this department, it has been demonstrated beyond a doubt that there can be a great saving to the city every year under a system of this kind, and it has now been permanently adopted by us.

Certain rules and regulations have been adopted to govern the same, the more prominent being that the head of each department shall be required to submit to the board a requisition for the supplies necessary for his particular department, and after the same has been approved by the board it is submitted to the Purchasing Agent, who makes the necessary purchases. He is required to notify all the dealers and manufacturers of any particular article required to submit a proposition, which is opened and read in the presence of the persons bidding. The award must then be made to the person agreeing to furnish articles at the lowest prices; the preference, however, in all instances being given to home dealers or manufacturers.

We have uniformly endeavored to secure the best quality of supplies at the very cheapest market-price, and in many instances have obtained the same quality of goods heretofore used by the departments at much lower figures. As far as can be learned, we have not exceeded in any instance the prices paid before this agency was established.

It is difficult to make comparisons and show figures, except in the purchase of staple articles, the prices which are more or less fixed. However, we think that the following figures will show that the system will give general satisfaction.

In the case of the purchase of one car-load of stone for sewer inlets,

the stone was purchased, according to the specifications, at a saving of \$66.40 to the city over former prices, the total of the purchase being \$357.

As late as April and May brick was bought for prices ranging from \$9 to \$9.95 per thousand. We are now getting the same brick from the same man for \$8.25 per thousand, a saving of \$37.50 on the first order of fifty thousand.

In May, 1894, the department was paying \$1.05 per barrel for Black Diamond cement, which is now bought in large and small lots at 80 cents a barrel, a saving of nearly twenty-five per cent. On Giant Portland cement and other brands 40 cents per barrel was saved.

The greatest saving has probably been in the purchase of sewer-pipe; it has averaged forty per cent, and during the month of June more than paid the expenses of the Purchasing Department.

In the purchase of white lead, of which the department uses large quantities, this department, by inviting competition, makes a good showing; vouchers showing that seven cents a pound has been paid for white lead, while we have been getting it for four and a quarter cents.

On a car-load of pig lead we made a saving of \$37.32, having secured it at \$3.28½ per hundred pounds, while previous purchases were made at \$3.40 per hundred, and as high as \$3.60.

It is hard to specify as to the prices for the smaller articles, which we have purchased in small quantities, but it is our belief that we have averaged a saving of fifteen per cent on all our purchases, not including those staple commodities, such as sugar, flour, hay, and oats, which are sold at the ruling market-price. In the matter of printing we make a particularly good showing.

Brooms which have been bought at \$6 per dozen were bought for \$2.50, and the same person who has been selling them at \$6 has offered to furnish the same broom for \$3. So much for competition.

In the matter of rubber and hemp packing there is also a great saving; we have secured for forty-three cents a pound the same material that formerly cost 60 cents per pound.

A number of other examples might be cited, all of which have been brought about by inviting active competition.

We recommend this idea to all cities not having the same in vogue. In Cincinnati the purchases made by this agency will amount to \$500,000 a year, and the figures before us will show that there can be a uniform saving of fifteen per cent as compared with the old system.

All the points of interest in the city of Buffalo were shown the visiting delegates, and after a few days' session the convention adjourned.

SECOND ANNUAL CONVENTION.

OFFICERS 1895-1896.

PRESIDENT:

G. H. BENZENBERG, Milwaukee, Wis.

FIRST VICE-PRESIDENT:

AUGUST HERRMANN, Cincinnati, O.

SECOND VICE-PRESIDENT:

WILLIAM D. KERR, Chicago, Ill.

THIRD VICE-PRESIDENT:

JAMES E. MCGANN, New Haven, Conn.

SECRETARY:

D. L. FULTON, Allegheny, Pa.

TREASURER:

JOHN L. KENNEDY, Nashville, Tenn.

FINANCE COMMITTEE:

L. W. RUNDLETT, St. Paul, Minn. F. G. O'BRIEN, Oswego, N. Y.

W. N. GLORE, Covington, Ky.

STANDING COMMITTEES:

Street Paving—A. D. Thompson, Peoria, Ill.; Nelson P. Lewis, Brooklyn, N. Y.; S. J. Hathaway, Marietta, O.

Electric Street-Lighting—J. A. Cabot, Cincinnati, O.; Harold P. Brown, Newark, N. J.; F. W. Cappelen, Minneapolis, Minn.

Sewerage and Sanitation—R. E. McMath, St. Louis, Mo.; G. L. Clausen, Chicago, Ill.; Geo. H. Fernald, Portland, Me.

Waterworks and Water-Supply—H. Van Duyne, Newark, N. J.; E. H. Keating, Toronto, Canada; S. C. Hathaway, New Bedford, Mass.

Taxation and Assessment—G. F. Munro, Omaha, Neb.; Thomas. D. DeVilbiss, Fort Wayne, Ind.; Charles P. Sayres, Camden, N. J.

City Government and Legislation—D. E. Wright, Cleveland, O.; C. C. Brown, Indianapolis, Ind.; J. McConkey, Harrisburg, Pa.

Disposition of Garbage and Street-Cleaning—John S. O'Shea, Buffalo, N. Y.; Lyman H. Johnson, New Haven, Conn.; Dr. J. W. Prendergast, Cincinnati, O.

AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS.

SECOND ANNUAL CONVENTION.

The great success of the Second Annual Convention of the American Society of Municipal Improvements was due, in large part, to the untiring work of the Cincinnati Committee of Arrangements. During the two months directly preceding the convention an immense amount of work was done. The committee consisted of President August Herrmann of the local Board of Administration and the other three members of the Board, John B. Washburn, John Frey, and George T. Sterritt. The committee was further augmented by the following heads of departments under the control of the board: A. P. Butterfield, Secretary; Willis P. Tharp, Superintendent of Waterworks; H. J. Stanley, Chief Civil Engineer; Dr. J. W. Prendergast, Health Officer; Fred. Amthauer, Superintendent of Street-Cleaning Department; Ed. Bogen, Superintendent of City Infirmary; R. H. Warder, Superintendent of Parks; Elliott Marfield, Purchasing Agent; J. A. Cabot, Electrician.

Upon this committee devolved the work of making all the arrangements for the convention. Communications were sent to all cities of the country which had a population of twenty thousand or over, advising them of the convention, and asking that they send representatives. Arrangements were perfected so that the visitors should be well entertained during the time they were not engaged in the business of the society. Headquarters were established at the Gibson House, on Walnut Street, and College Hall, which is directly across the street, was selected as the place of holding the convention. A splendid souvenir programme was prepared and sent to all the large cities, thus further advertising the convention.

All the prominent city and county officials were selected to act as members of a reception committee to receive the expected guests. A badge, consisting of a silk American flag, which backed a strip of birch-bark upon which was printed the title of the society, was prepared and furnished to all visitors and delegates. This entitled them to ride free on all street-car lines, and entitled them to many other courtesies, among which was the free use of the long-distance telephone. In fact, nothing which could add to the comfort and pleasure of the visiting delegates was left undone, and as a consequence the convention was an unparalleled success.

The details of the work done at the convention and the entertainment afforded appears in the following report of the proceedings, published in accordance with a resolution of the society.

Wednesday, September 11th—Morning.

At 10:30 o'clock on the morning of September 11th, the delegates having assembled in College Hall, the convention was formally called to order by President August Herrmann of the local Board of Administration, acting as temporary chairman. His address was as follows:

GENTLEMEN: A year ago my colleagues and myself, representing the Board of Administration of Cincinnati, together with some of the heads of departments under control of our board, responded to a call—to meet in the city of Buffalo—for the purpose of organizing the society now assembled here in convention, and known as "The American Society of Municipal Improvements."

At the meeting of the society at that time, after quite a lively contest, Cincinnati was chosen as the place for holding the second annual convention. Thereupon we promised the delegates there assembled that when they met again, a year hence, in Cincinnati, the town would be theirs, and that we would make their stay both profitable and entertaining. That promise we not only expect to but will make good.

In this connection I desire to call your attention to the entertainment part of the programme that we have provided for you.

Mr. Herrmann then announced in detail what the entertainment would consist of on the various days that the convention would be in session, which appears in the report following.

It will be important that the delegates and visitors assemble promptly at the hours mentioned on these various days. This will enable you

to hold the sessions of the convention proper on the mornings of each of these days, to-morrow evening, and on Friday afternoon up to 3:30 o'clock.

While we are not altogether familiar with what other cities may do in this respect, on an occasion of this kind we do know and feel satisfied in saying to you now that no effort has been spared to make the entertainment provided for an event that will eclipse any thing of the kind ever contemplated in this city.

I also desire to announce to the delegates that courtesies have been extended to the society and visitors by the Mt. Adams and Eden-Park Inclined Plane Railroad Company, Cincinnati Street Railway Company, Cincinnati Inclined Plane Railway Company, Mt. Auburn Cable Railway Company, Covington and Newport Street Railway Companies, Art Museum, Zoological Gardens, Chamber of Commerce, American District Telegraph Company for any messenger service, Bell Telephone Company for long-distance telephone service, Cincinnati Observatory, Society of Natural History, and that, upon presentation of your badges, you will be permitted the privileges of any or all of them. All the public institutions of the city and county will be open for the inspection of the delegates and visitors during the convention.

A number of merchants and business men in Cincinnati have responded willingly and generously to make this the Second Annual Convention of the Society a success, and on their behalf, and on behalf of the people of Cincinnati in general, I now have the honor of presenting to you, for an address of welcome, the Hon. John A. Caldwell, Mayor of Cincinnati.

Mayor Caldwell then addressed the convention as follows:

MR. PRESIDENT AND GENTLEMEN OF THE
AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS:

The citizens of Cincinnati, through me as their representative, extend to you greeting and the hospitality and liberty of our city.

The wisdom of a convention of this character is self-evident. You meet to exchange ideas and views and present facts, in order that the most potent, practical, and advanced methods may be adopted for the better government of municipalities.

As representatives of the different cities throughout the country, you convene to get broader and better ideas of the best way to prosecute the work devolving upon you in your different official capacities; how to secure the best and purest water-supply at the cheapest cost; how to beautify your cities with parks and breathing-places; how to secure and maintain efficient police and fire departments; how to provide your city with sufficient light at the lowest cost; how to pave, clean, and repair your streets and alleys; to secure for your people the best possible street-car service; regulate sanitation and prevent disease; how to best lessen

taxation; in other words, how to conduct the affairs of public office for the highest and best interests of the people whom you serve.

The progress of a city largely depends upon the broadness, the integrity, and the efficiency of her public officials. We Cincinnatians take a good deal of pride in the commendable progress our city has made in the administration of public affairs during the last ten years. We show you one of the best paved cities in the United States; we believe our police and fire departments have no superior; our park system is somewhat stinted, but both pleasing and beautiful. We have a University, now being enlarged by the generosity of one of our most prominent citizens, which places higher education within the reach of all, while our public-school system is the pride of every citizen. In music, in art, and in science we believe our Queen City excels. Our hospital and charitable institutions compare favorably with those of any other city. Our facilities for shipping, both by water and rail, are unsurpassed by any inland city in our country. Cincinnati is the gateway to the great and rapidly-developing South, and we link the great East with the greater West. Our banks and business concerns are conservative and sound, remaining unshaken amid the ruins of every panic. Our citizenship is the best and most patriotic in the world. Yet with all these advantages and all we have we expect to learn much that is wise and beneficial in the management of municipalities from you gentlemen who hail from the cities all over this country.

I congratulate you, gentlemen, upon the organization of this society, which, I repeat, must necessarily result in broadening your ideas and better fitting you to more successfully carry out the ambition of every conscientious official, which is to render to his people the very best possible administration of public affairs.

It is a great pleasure, as the chief executive of this city, to welcome you within our gates, and to assure you that you have the undisputed right to the liberty and privileges of our city and to command us in any thing that will make your visit most pleasant and profitable.

President M. J. Murphy, of the society, was down on the programme to respond to the address of welcome, but was not present. Mr. Herrmann then introduced the First Vice-president, as follows:

MR. HERRMANN: Last year, when we met in Buffalo, Mr. M. J. Murphy was unable to attend, owing to illness in his family; but, nevertheless, he was elected President. This year he is not here, and I understand that he is no longer an official, and therefore possibly not a member of the society. I now take pleasure in introducing to you our First Vice-president, the Hon. George H. Benzenberg, Chairman of the Board of Public Works and City Engineer of Milwaukee.

Mr. Benzenberg then delivered the following address:

MR. MAYOR, CHAIRMAN,*AND GENTLEMEN:

Words fail me in responding to the sentiments of hospitality and courtesy to our members here assembled in their second annual gathering. It is true that these do not come to us unexpected. From the cordial invitations we all received from the Cincinnati committee, and from the programme prepared for us, we were ready to imagine much of the good fortune that has befallen us.

I am only a little afraid that you may have gone too far with some of our delegates. The cordiality of your welcome, and the generous and whole-souled way in which the delegates have been assured that the city is ours, may prove too much for them, and cause you to find that a part of your municipality will be missing after this convention has adjourned. [Laughter.] You have held out dangerous inducements for that result, especially in mentioning that you have one of the largest breweries of the country. In Milwaukee we do not mind about that so much, but with the delegates from other cities it might be different.

Our society is on the threshold of a great and useful future. When it first met, one year ago, there were present only the representatives of thirteen cities, and it was very doubtful what its future would be. We are meeting to-day with a representation of seventy cities and one hundred and fifty delegates. They are the men whom the people have intrusted with the great public works in which every year more than one hundred million dollars is expended.

The object of our society is to promote their efficiency by gaining from the knowledge and experience of others, and by enlightening them that they may be able to avoid the dangers, risks, and errors into which so many have fallen, and which have resulted in loss and detriment to the cities. It is to be noted that so many of the younger cities are alive to these facts. Instead of blundering along in the old way, at great cost to themselves, they are sending their delegates here to learn what is best and newest and successful in public works, and they will build their future on the knowledge so obtained.

This means, in the first place, economy. Public works will be built in the most economical manner, and in the best manner for the health, comfort, and enjoyment of the people. It is for this we shall labor here.

Again, Mr. Chairman, in behalf of the convention and of our society, I desire to thank you. [Great applause.]

Here Mr. Benzenberg took the chair.

THE PRESIDENT: Gentlemen, the programme that has been prepared by the Committee of Arrangements at Cincinnati will occupy so much of your time that it will be necessary to get down to work at once, in order to get through. We will therefore proceed at once with the business of the convention, and I suppose that the first would

be the reading of the minutes of our last session; however, a motion to dispense with that would be in order.

It was moved and adopted that the reading of the minutes be dispensed with.

THE PRESIDENT: At the last meeting an Executive Committee was appointed, which met last evening. Unfortunately, Mr. Murphy, not being longer identified with this society, was not present, so that we could not get the assistance from him that we hoped he might give us. I was not aware that he had left his office until about a week ago to-day. Mr. George S. Gatchell, of Buffalo, also could not be with us; so those who were present prepared a constitution. As you are aware, a constitution was briefly prepared and adopted in Buffalo, and I will now request the Secretary to read the new constitution.

The Secretary then read the proposed new constitution.

ARTICLE I.—NAME AND OBJECT.

The objects of this society, which shall be known as "The American Society of Municipal Improvements," shall be to disseminate information and experience upon and to promote the best methods to be employed in the management of municipal departments and in the construction of municipal works, by means of annual conventions, the reading and discussion of papers upon municipal improvements, and by social and friendly intercourse at such conventions, and to circulate among its members, by means of an annual publication, the information thus obtained.

ARTICLE II.—MEMBERSHIP.

SEC. 1. Any municipality within America shall be eligible to membership in this society, likewise any engineer, officer, or director who shall have charge or supervision of any public or municipal department or works.

SEC. 2. Every application for membership shall be in writing, stating the name, location, and department; and, if of an individual, shall also state the age, residence, and position of the applicant.

SEC. 3. Any member who shall have ceased to be eligible to membership, or who shall be in arrears for more than one year's dues, shall be considered as no longer a member of this society, and his or its name shall be discontinued from the roll by the Secretary.

SEC. 4. Any member may withdraw from the society upon the payment of all dues to date, and by notifying the Secretary thereof in writing.

SEC. 5. Any member may be expelled from the society upon the recommendation of the Executive Committee, adopted by a two-third vote of all the members present.

ARTICLE III.—FEES AND DUES.

SEC. 1. The admission fee for each individual who is eligible to membership, and for each and every delegate or representative from any municipality, shall be five dollars, which in all cases must accompany the application.

SEC. 2. The dues for each member or individual representative shall be three dollars per annum, payable on or before the annual date of the meeting.

ARTICLE IV.—OFFICERS.

SEC. 1. The officers of this society shall consist of a President, three Vice-presidents, a Secretary, and a Treasurer, each of whom shall be a resident of a different state, and who with the past presidents shall act as an Executive Committee for and in behalf of the society.

SEC. 2. There shall also be elected a Finance Committee, consisting of three members of the society.

SEC. 3. In case any of the above positions (excepting the presidency) become vacant, the President shall fill such vacancy by appointment from the membership.

ARTICLE V.—ELECTION.

SEC. 1. The officers of this society shall be elected by ballot on the second day of each annual convention, and each municipality shall be entitled to as many votes as it has representatives present.

SEC. 2. The President shall not be eligible to immediate re-election (except by unanimous vote).

SEC. 3. The officers elected shall assume office immediately after the close of the annual meeting at which they were elected.

SEC. 4. The ballot for any officer may be waived by unanimous consent.

ARTICLE VI.—DUTIES.

SEC. 1. The President shall preside at the meetings of the society and at those of the Executive Committee, and shall perform such other duties as are incumbent upon the office. In the absence of the President, or upon his becoming ineligible, the senior Vice-president shall assume and perform the duties of the office.

SEC. 2. The Secretary shall keep accurate minutes of the proceedings of the society and of the Executive Committee, shall conduct all correspondence, shall issue notices of any meeting of the society not less than four weeks prior to the date of such meeting, shall collect and receipt for all fees and dues and pay them to the Treasurer quarterly, taking his receipt for the same, and to keep accurate account between the society and its members.

SEC. 3. The Treasurer shall receive from the Secretary and safely keep all the moneys belonging to the society, giving his receipt therefor, shall

pay all bills approved by the Finance Committee or the President, shall keep a correct account of the funds of the society, and submit to it at its annual meeting a report of all receipts and disbursements during the preceding year.

SEC. 4. The Executive Committee shall manage all the affairs of the society, subject to the action and approval of the society at its meeting. All questions in Executive Committee shall be decided by a majority vote, and five members shall constitute a quorum, not less than four of whom shall be officers of the society. The Executive Committee shall meet at least once each year, on the morning of the first day of the annual meeting of the society, and as much oftener as the President may determine.

SEC. 5. The Finance Committee shall meet on the morning of the first day and previous to the annual meeting of the society to examine and audit the Secretary's and Treasurer's accounts and annual statements, and report thereon to the society.

ARTICLE VII.—MEETINGS.

SEC. 1. The annual meeting of the society shall be held on the second Wednesday in September of each year in such city as the majority of the members voting shall decide; selection of place of meeting to be made after the officers shall have been elected.

SEC. 2. At the annual meeting of the society fifty members shall constitute a quorum for the transaction of business.

SEC. 3. Any member, with the concurrence of the presiding officer, may admit friends to the meeting of the society, but such person or persons shall not, without the consent of the meeting, be permitted to take part in any discussion.

SEC. 4. All papers, drawings, etc., submitted to the meeting of the society shall be and remain the property of the society.

ARTICLE VIII.—ORDER OF BUSINESS.

SEC. 1. At the annual meeting of the society the order of business shall be as follows:

1. Roll call;
2. Reading of minutes of last meeting;
3. Considering of applications for membership;
4. The President's address;
5. Reports of the Secretary and the Treasurer;
6. Report of the Executive Committee;
7. Report of the Finance Committee;
8. Report of special committees;
9. Reading and discussion of papers;
10. Election of officers;
11. Selecting next place of meeting;
12. General business.

SEC. 2. All questions shall be decided by vote, and all differences of opinion in regard to points of order shall be settled by parliamentary practice, as set forth in Cushing's Manual.

ARTICLE IX.—AMENDMENTS.

The foregoing constitution and articles may be amended on or after the second day of any annual meeting of the society by a two-third vote of all members voting; provided, such proposed amendment shall have been submitted to the society in writing on the first day of its annual meeting.

THE PRESIDENT: You have heard the reading of the constitution as prepared by the Executive Committee last night. What is your pleasure in regard to it?

MR. JOHNSON, Saginaw, Mich.: I would like to ask the Secretary to read that part of the constitution in regard to fees and dues.

The Secretary then read Article III, in regard to fees and dues.

MR. HERRMANN: I desire to offer the following amendment to Article II, Section 1, as well as to Article III, Sections 1 and 2:

Article II, Section 1.—“Any municipality within America shall be eligible to membership in this society. When a municipality has become a member of the society, then any person of such municipality representing any municipal board or department may also become a member.”

Article III, Section 1.—“Each municipality desiring to become a member of this society may do so by the payment of five dollars admission fee, which will entitle said municipality to as many members to said society representing boards or departments of said municipality as may be desired without any additional admission fee, but upon the payment of dues hereinafter prescribed.”

Section 2.—“Municipalities shall not be required to pay any dues, but each individual representing any department of a municipality that has acquired a membership in the society shall pay three dollars per annum as dues, the same to be payable on or before the date of the annual meeting.”

MR. WASHBURN, Cincinnati, O.: I second the amendment.

THE PRESIDENT: You have heard the amendments to Article II, Section 1, and Article III, Sections 1 and 2. What is your pleasure in regard to them?

MR. STATES, New Haven, Conn.: The amendment is not clear to me. I understand that the convention in Buffalo elected Mr. Murphy as President, and I understand now that he is no longer a member

of this society. He has not resigned. The only reason that he is not a member, as I understand it, is because he is no longer an official.

THE PRESIDENT: I understand that Mr. Murphy has sent in his resignation, he no longer being an official, and that he has gone back to his old profession, that of the law.

MR. STATES: I do not think that this is right, that when a person is no longer an official his membership in this society should cease. To-day there are two hundred and fifty delegates present who certainly represent different cities, and it is possible that between now and next December two hundred and twenty-five of us will be out of office; then the membership in this society will cease. I think something ought to be provided in the constitution where members of this society who no longer are officials may be identified with this organization.

MR. KERR, Chicago, Ill.: I believe that it would be for the best interest of this organization to have this constitution printed, and every member should get a copy of it in order to give this matter a careful consideration. I would therefore move you that the Executive Committee be authorized to have the constitution printed, and every member should get a copy of it.

THE PRESIDENT: The constitution is already in the hands of the printer, and you will all have a copy of it before to-morrow.

MR. HERRMANN: I believe that the best way to get at this would be to take it up article by article.

MR. KERR: I would move you that the amendments offered by Mr. Herrmann be postponed one day.

MR. CAPPELEN, Minneapolis, Minn.: I would like to know who are the members of this society. Last year in Buffalo there were thirteen cities represented; to-day there are seventy. I would like to ask if only the thirteen cities are entitled to vote, or the seventy?

THE PRESIDENT: Unless objection is made, all delegates present will be considered as members of the association. [Applause.]

MR. MUNRO, Omaha, Neb.: The question of the gentleman from Chicago is proper. Let us have this constitution printed and get acquainted with it before we act upon it, and then adopt it on a business basis.

MR. STATES: Mr. President, I would like to have the Secretary read the old constitution.

The Secretary then read the old constitution. (See Proceedings of First Annual Convention of the Society for old constitution.)

MR. GAMBLE, Lima, O.: I am not at present a member of this society, but have come to this convention for the purpose of becoming a member. I am not here as a representative, sent by the city of Lima, but as an individual. It seems to me that the motion on this question is one which will determine the conditions on which we may become members, and also the conditions which may terminate our membership. One must be a municipal officer before he can become a member of this society, and when he retires from such office his membership in this society is absolutely severed. This being true, it would be folly for an individual to pay the admission fee and the annual dues to become a member, because he has no assurance of being retained in office. This is a question which I would like to have settled before making formal application for membership.

MR. VAN DUYNE, Newark, N. J.: Mr. President, I would like to see this matter settled without taking most of to-morrow in discussing it, and would therefore move that you appoint a committee of five members to endeavor to agree upon a new constitution.

THE PRESIDENT: As the constitution is now in the hands of the convention, nothing could be gained by appointing five members.

MR. VAN DUYNE: Well, I will move then that the new constitution with the amendments be referred back to the Executive Committee, and that the President appoint five members to aid the Executive Committee in agreeing upon a constitution.

Which motion was carried.

THE PRESIDENT: I will appoint Kerr of Chicago, States of New Haven, Van Duyne of Newark, Rundlett of St. Paul, and McMath of St. Louis, and I request the Executive Committee, together with the committee just appointed, to meet to-morrow morning at 8:45 A.M., so as to report to the convention to-morrow morning. I will request the Secretary now to read the resignation of Mr. Murphy.

The Secretary then read the following letter, which he received from Mr. Murphy:

ST. LOUIS, MO., August 19, 1895.

MR. D. L. FULTON,

Secretary American Society Municipal Improvements:

DEAR SIR,—My term of office having expired, and my official connection with municipal affairs being thereby closed, I hereby tender my resignation of the office of President of the American Society of Muni-

cipal Improvements, to take effect immediately. I take this step at this time so as to afford an opportunity to yourself and your associates to complete the arrangements for the annual convention at Cincinnati independent of me. I request you to return for me to the association my earnest and sincere thanks for the honor conferred upon me when I was vested with the presidency of so important an organization as the American Society of Municipal Improvements. I will always regard it as one of the greatest honors of my official life.

Very sincerely yours,

M. J. MURPHY.

THE PRESIDENT: You have heard the reading of the resignation of Mr. Murphy. What is your pleasure in regard to it?

MR. HERRMANN: I move that the resignation be accepted.

MR. KERR: I offer as an amendment, Mr. President, that the action be deferred on this communication until to-morrow, in order to see what the new constitution will provide.

THE PRESIDENT: You have heard the motion, that action be deferred on Mr. Murphy's resignation until to-morrow. All those who are in favor of the motion will give their consent by saying aye. [Carried.]

THE PRESIDENT: The business of this morning being ended, if no objection is raised, we will proceed with the reading of the papers. I will therefore call upon Mr. W. G. Wilkins, City Engineer of Allegheny, Pa.

Mr. Wilkins being introduced, read the following paper:

SPECIFICATIONS FOR VITRIFIED PAVING-BRICK.

BY W. G. WILKINS, C. E., ALLEGHENY, PA.

The writer, shortly after taking charge of the Bureau of Engineering and Surveys of Allegheny City, Pa., was called upon to prepare specifications for vitrified brick pavements. This being something in which he had had no previous experience, he naturally concluded that it would be well to look up and study the specifications of other cities which had used this material for street-paving purposes. With this object in view, he wrote to a number of city engineers in various cities, and through their courtesy obtained copies of their specifications.

The first question which he hoped to have answered by these specifications was, "What are the requirements of a first-class paving-brick; and, second, what are the tests necessary to determine if the bricks come up to these requirements?" On reading the various specifications over, instead of finding a uniformity of opinion, he found almost as many

opinions as there were specifications. Some of the writers of the specifications seemed to have no idea of what tests to subject the brick to; or, if they had, seemed to be afraid to express them in their specifications.

In one specification, which we will call Specification No. 1, under the head of Paving-bricks, is found the following: "Paving-bricks shall consist of the best quality of sound hard-burned, machine-pressed paving-bricks, made and burned especially for street-paving purposes, and shall stand all reasonable tests as to durability and fitness required by the engineer and to which paving material is usually subjected; the material to be burned in down-draft kilns or furnaces; all bricks to be square and straight, free from cracks and other defects, of uniform size and texture of not less than $2\frac{1}{2} \times 4\frac{1}{4} \times 8$ inches, and of a quality to be approved of by the engineer, and equal to the samples deposited in his office, and in his judgment to be equal to the best samples of paving-brick in the market."

The writer hopes he will be pardoned by the author of these specifications for criticising them, and begs leave to assure him that it is done in no captious spirit, but in the hope that it will aid, by bringing out discussion, in determining what are "the tests to which paving material are usually subjected," and be the means of determining "what reasonable tests paving bricks should be subjected to" before they are accepted by the engineer and allowed to go into the pavements.

The writer believes that engineers should have certain and well-defined ideas as to what materials are fit for a particular work on which he may be engaged; also what tests are necessary to determine the fitness of these materials, and that the specifications should specifically state what the requirements will be. It is only fair to contractors who are bidding on a piece of work that the requirements should be plainly stated, and not say that "the material shall be subjected to such reasonable tests as may be required by the engineer." If a bidder knows before making up his bid what he will be required to furnish, both in the way of material and workmanship, he can make his bid intelligently, and know before he bids whether he can comply with the requirements of the specifications. If the requirements are such that he feels he can not live up to them, he ought not to bid on the work; for if he is the successful bidder, he will only be laying up "wrath to come," in the shape of condemnation by the engineer and probably financial loss to himself.

But to return to the question, "What are the requirements of a good paving-brick?" This question is well answered in the reports of the municipal officers of the city of Roanoke, Va., for 1893, so far as the general requirements are concerned. They say: "We believe that when the factors which enter into what constitutes a good pavement are carefully considered, that vitrified brick possess those factors in a pre-eminent degree—1. Economy in first cost; 2. Economy in maintenance; 3. Resistance to abrasion and attrition; 4. Resistance to absorption, and con-

sequent freedom from disintegration from freezing; 5. Sanitary advantages and facility with which the streets may be cleaned; 6. Freedom from noise of traffic; 7. General evenness of surface."

The second question, "What are the tests necessary to determine if the bricks come up to these requirements?" is what we are principally concerned in; the question of economy of first cost is easily answered by a comparison of the prices of brick pavements with those of stone or asphalt.

The relative economy of maintenance seems to be decided in favor of vitrified brick over cobble or block stone by the experience of those who have had the maintenance of the various kinds of pavements. The question of what shall be the special requirements of the tests for abrasion and attrition is not so easily answered. One city engineer to whom the author wrote replied, "There is no test but actual use in the roadway that I consider of any use." This might prove a very expensive test to a city that was just beginning the use of vitrified brick for street-paving; in fact, the writer knows of one city where one such test has resulted in the Department of Public Works excluding this material for paving purposes entirely. This the writer believes to be a mistake, as in all cities there are streets and alleys on which the traffic is so light that the first cost and maintenance alone would make the use of brick very desirable, and which by reason of the greater cost of other material would go unpaved for many years. What we wish to know is, what physical tests can we subject paving-brick to, the result of which will indicate, in some degree, the probable wear or life of the bricks in actual use under the traffic they will be subjected to on the streets. Let us see what the opinions of some city engineers are on this subject, as shown by their specifications.

SPECIFICATION NO. 2.—"All bricks shall pass satisfactory abrasion and impact tests in comparison with other paving-bricks."

SPECIFICATION NO. 3.—"Paving-bricks shall stand all reasonable tests as to durability and fitness to which paving material is usually subjected."

SPECIFICATION NO. 4.—"Ten standard specimen brick are on file in the office of the Chief Engineer of the Board of Administration which indicate the quality required by these specifications, and all specimen bricks submitted must, in the opinion of the Board of Administration, be equal in quality to the said specimen brick on file or they will not be accepted."

These specifications do not answer the question at all, and are open to the same criticism, on the ground of indefiniteness, as the first specification above quoted.

SPECIFICATION NO. 5.—"*Abrasion*—If the average loss of three brick be more than thirty per cent of their weight when subjected to the prescribed abrasion test, the bricks of which they are samples shall be rejected. The first tumbling shall continue one hour in a barrel three

feet long and two feet in diameter, with thirty to thirty-five revolutions per minute, containing about one hundred pounds of scrap iron and about one hundred pounds of pig iron. The second tumbling shall continue two hours in the same barrel containing scrap iron only."

SPECIFICATION NO. 6.—"Such specimen bricks, or as many of them as may be required by the Commissioner of Public Works, shall be subjected to a test of one hour in the machine known as a rattler, and if the loss by abrasion during such test shall exceed eight per cent of the original weight of the bricks tested, then such bid will be rejected. The loss by abrasion shall not be more than two and a quarter times that of Georgia Lithonia granite."

One city engineer writes: "One method of testing has been to rattle six hours at about fifty revolutions per minute, the rattler containing five samples of six bricks each, or thirty bricks, with about one hundred and fifty pounds of cast iron. A loss of fifteen per cent is allowed."

Another engineer says: "We make tumbler tests of one hour, the tumbler making twenty-two revolutions per minute. We add for each twelve brick in the tumbler forty pounds of cast iron in about three-inch cubes; loss not to exceed twenty per cent of original weight for acceptable bricks." Another says: "We use a rattler revolving one hour at thirty revolutions per minute with one hundred and fifty pounds of scrap iron, none of which weigh more than ten or twelve ounces."

Enough specifications for abrasion tests have been quoted from to show the great variety of opinions as to what the requirements of this test should be. The time of rattling runs from one hour to six hours, the speed of revolutions from twenty-two to thirty-five per minute, and the allowable percentage of loss in weight from eight to thirty.

The following are a few extracts from various specifications regarding the absorption tests:

SPECIFICATION NO. 5.—"The average absorption of any three bricks must not be more than three per cent when dried and immersed in water forty-eight hours."

SPECIFICATION NO. 6.—"Not less than three bricks shall be broken across, thoroughly dried and immersed in water seventy-two hours; absorption must not exceed two per cent of their weight when dry, or the same shall be rejected."

SPECIFICATION NO. 4.—"Any bricks showing a water absorption exceeding two per cent of their weight shall be rejected. The test will be made in the following manner, viz.: The bricks will be broken across the middle, thoroughly dried and immersed in water seventy-two hours."

One engineer writes, "The absorption test should be made by first drying the bricks taken from the tumbler and then immersing in water for twenty-four or forty-eight hours." Another engineer says, "After rolling the brick are dried and immersed in water for forty-eight hours, an increase of weight of one and a half per cent being allowed."

The variety of opinions regarding the manner of making this test are almost as great as on the abrasion test. Some make the test on whole bricks, some on half bricks, and some on bricks that have been tested for abrasion; but the percentage of absorption varies slightly, being from one and a half to three per cent.

A third test, in which there is a great difference in the manner in which it is made and in the requirements, is the crushing test. Sometimes the test is made on a whole brick, sometimes on a half brick; some test the brick on the flat and some on the edge. In some cases the brick receive no special preparation for the test, the brick being placed in the machine between two pieces of card-board or sheet-lead, so as to aid in distributing the pressure uniformly over the entire surface. Others plane or rub the brick, to give two parallel surfaces, with the same object in view. The requirements of engineers vary from six thousand to fifteen thousand pounds per square inch.

Still another test, very largely advised, is the transverse breaking test. This is made by placing the brick on the rounded knife-edges six inches apart, and the pressure brought on the middle of the top face by a rounded knife-edge. The breaking load is then divided by the width in inches, to determine the breaking load per inch in width. The requirements for this test also vary according to the idea of the engineer.

Enough examples have been given to show the marked difference of opinion as to what the tests are that are necessary to determine the qualities of a good paving-brick. There is a difference of opinion not only as to the requirements of the different tests, but the comparative weight to be given the various tests. One engineer will claim that the transverse test is the most important, another that the abrasion test is the crucial one, and another may claim the absorption test to be equally important. It would seem, in view of the largely-increasing use of brick as a paving material, that the time had come for some influential body, such as "The American Society of Municipal Improvements," to take up the subject, and after a series of tests made on bricks that have been taken from streets under traffic prepare a specification that would be a standard for the United States. Such a specification would be a great desideratum not only for engineers in charge of street-paving, but also for manufacturers of paving-brick.

There has been a committee of the National Brick Manufacturers' Association appointed to prepare a standard specification for paving-brick, and which has already held one meeting. It might be well for this society to appoint a committee to co-operate with the manufacturers' committee, and by such co-operation a standard specification could be secured which would be acceptable to both the manufacturer and the engineer. If this were done, there would possibly result a specification which would be fair to both, and the manufacturers could not then say that the engineers had prepared specifications which were impossible to comply with; and

the engineer could not say that "it was a manufacturers' specification," and the requirements not rigid enough.

The writer's own opinion is that such a specification should cover only the physical requirements to which the bricks would be subjected in testing them, and that they shall not go into the details of the manufacturing process. This is a matter the manufacturers are mostly concerned with; and if they are given the tests their product will have to pass, they will very soon turn out a product that will meet these requirements. The tests of paving-brick, as well as all engineering material, should be conducted under conditions as nearly as possible the same as they are subjected to in actual service.

The writer believes there should be an impact test made on brick supported in a sand cushion of about two inches in thickness, such as are usually laid under all brick pavements. What the requirements of this test should be can only be settled after an exhaustive series of experiments have been made, as outlined above.

In conclusion, the author would quote from a letter recently received from a brother engineer: "The subject seems to be demanding the attention of many engineers of the large cities that are at present using the vitrified brick for street-paving purposes, and it is the duty of those having charge of such work to formulate some system which when adopted would furnish means of determining the qualities essential, and of comparing results of such tests made at any place on brick of the various manufacturers of the country."

The author's purpose in writing this paper has been to call attention to the importance of standard tests for paving-brick; and if it shall in any degree assist in preparing such standard tests, its purpose will have been accomplished.

THE PRESIDENT: This paper is now before the convention for discussion. If any one desires to ask any questions, Mr. Wilkins will undoubtedly be glad to answer them.

MR. CAPPELEN: I want to ask Mr. Wilkins which plan he adopted?

MR. WILKINS: I prepared the specifications, but it was done very hurriedly, and I admit they are open to criticism. I will read the tests I prepared; but if I have to prepare specifications next year, I will change them somewhat: "All brick to be tested by the director of the Department of Public Works. Test to be made from samples of brick delivered for use on the street. Six samples selected by the engineer in charge will be used and tests made as follows: 1. Crushing; 2. Abrasion; 3. Absorption. Crushing tests to be made to accurately determine the weight required per square inch to crush the bricks. Abrasion tests will be made by placing brick in a rattler along with four hundred pounds of iron castings, each weighing from five to

seven pounds; speed of rattler forty revolutions per minute; time of rattling one hour; weights to be taken before and after rattling. Absorption tests will be made by immersing half bricks in water for twenty-four hours; weights to be taken before and after immersion. The tests must show the following results before the brick will be accepted : 1. Crushing not less than eight thousand pounds per square inch; tests to be made on half brick on edge; 2. Abrasion, reduction not more than three per cent; 3. Absorption, increase not more than two and a half per cent." Those tests I prescribed after having a series of tests made on about twenty-five sample bricks, which were submitted by the various manufacturers that proposed to furnish brick to the city. The requirements of the specifications were all very much lower than the results obtained from the tests of these sample bricks. For instance, on the crushing test I had a large number of tests run over fifteen thousand pounds; some ran as high as nineteen thousand pounds; the average was about thirteen thousand pounds. I placed my requirements at eight thousand, thinking that was very much greater than any loads that would come on them in use. In the rattler test I use four hundred pounds of cast iron, which is more than I know of any other city using. The greatest abrasion was 5.67 per cent; some went much lower. I put the requirements of the test at three per cent.

MR. CAPPELEN: How long did the test last?

MR. WILKINS: With four hundred pounds of cast iron one hour. The specifications of other cities allow from eight to thirty per cent of abrasion. From the result of my own test I thought three per cent was high enough. In fact, I found one brick which showed practically no abrasion.

MR. CAPPELEN: How large was the cylinder?

MR. WILKINS: Three feet long and two feet in diameter, forty revolutions per minute.

MR. CAPPELEN: What shape was the cast iron?

MR. WILKINS: Ordinary rough pieces of cast iron. None of them weighed over seven pounds. There were four hundred pounds of them. I think that was a very severe test.

MR. CAPPELEN: What proportion of your rattler was filled?

MR. WILKINS: I think it was about half full. I put in six bricks at a time—six bricks of each kind.

MR. CAPPELEN: What brick was it you adopted?

MR. WILKINS: This preliminary test of the bricks presented to me by the manufacturers was made before I drew up the specifications. Our contracts simply required that the brick come up to the specifications. I have had contractors come in and ask what brick I preferred. I said I did not care what brick they had so they came up to the requirements. If they could buy such brick from others than those they had been buying from for less money, they would be foolish if they did not do so. All the engineer was concerned in was the result of the test of the brick. If they fulfilled the test, that was sufficient.

MR. CAPPELEN: I notice in your paper you speak of testing a brick on a cushion foundation.

MR. WILKINS: I think it should be done. It is put on a cushion in the street, and I think it ought to be put on a cushion foundation and tested by a blow. We always place in our city six inches of concrete, two inches of sand, and the brick on top of that.

MR. KERR: We have in the city of Chicago, or did have, about a mile and a half of vitrified brick out of eleven hundred miles of paved streets. The question of using a vitrified brick for pavement arose some time since, and was considerably discussed in the Council, and last month it was decided that it was for the best interests of the city to make a thorough test of the bricks of the country. For that purpose I did not think it best to have samples sent to us, which might possibly be prepared for the occasion; so I sent a deputy engineer of the department to the different kilns of the country—to eighteen kilns—and he went to the yards and took from them samples. At the present time we are having the test made by Prof. Baker, of the Illinois State University at Champaign. Prof. Baker has given the subject considerable attention, and is an expert on vitrified brick. We require a pressed brick manufactured from pure shale, which shall stand the absorption and abrasion tests. Those tests are being made at the present time, but are incomplete. I am sorry they are not completed, as I think they would be found to be valuable. The tests will be completed in two weeks, when I will be pleased to have the results prepared and sent to the different members of the organization.

MR. ADAM, Newark, N. J.: The city of Newark decided for the first time to lay some brick paving. It was to be laid upon a six-inch concrete base. The experience of the city has been that the asphalt paving was practically controlled by one company, and that the price

per square yard was held very high, some of the paving costing as much as \$2.90, providing for a six-inch concrete foundation with two and a half inches of asphalt covering. This year it costs but \$2.68 to \$2.72, consisting of six inches concrete, one and a half inches binder course mixed with asphalt, and two inches of asphalt covering. The Board of Works, the engineer of the Water Department, and myself went to Philadelphia and Trenton to examine the brick pavings of those cities. From what was seen, it was concluded that brick paving was no longer to be considered an experiment. We, therefore, set about getting up specifications. In preparing them I experienced the same difficulty that Mr. Wilkins spoke of. I requested several engineers of other cities to favor me with a specification for brick paving as used in their place. No two were alike. Mr. Sherrd, the engineer of the water department, who had some experience in brick paving in the city of Troy, N. Y., as former city engineer of that place, by the request of the board, assisted me in getting up the specifications and making the tests which were to determine the conditions under which bids were to be accepted. The brick manufacturers upon hearing that the city intended to put down brick pavements sent their samples very freely. We received about thirty-four different makes. It was determined to make the absorption test by taking half bricks and drying them for twenty-four hours in a baker's oven, and then immersing them in water. From the results ascertained it was decided to make the absorption test three per cent. For abrasion two bricks of each kind were put into a tumbler with one hundred and fifty pounds of scrap iron, consisting of pieces weighing from one to five pounds. The tumbler measured two feet in diameter and four feet in length, revolving at the rate of forty-three revolutions per minute. After the first twenty minutes the brick were taken out and weighed. They were again put in and subjected to twenty minutes more tumbling. The average loss of weight of the first twenty minutes and that of the second were added, and the average of the two adopted as the per cent of loss. It was concluded to make the per cent of abrasion eight per cent. The modulus of rupture was fixed to be eight thousand pounds to the square inch. Only eight of the thirty-four samples passed the test successfully. These percentages were stipulated in the specifications. Any bidder was permitted to present new specimens of brick, or new samples of those which had been previously tested. This may have been a severer test than called for in other places, as

some brick which were used in brick pavings in other cities, and apparently giving entire satisfaction, had to be thrown out, as they did not come up to the requirements of the test. I therefore think that Mr. Wilkins is correct in his view, that it would be wise and also just to the brick-paving manufacturers that this association appoint a committee to co-operate with the one appointed by the brick manufacturers to ascertain and establish a fair and uniform test of paving-bricks, such as has been established by the American Society of Civil Engineers in the matter of cement tests. My belief is that there is a wide field for brick paving, and that it will tend to moderate the price for asphalt pavements, which, in a certain measure, are considered a monopoly.

THE PRESIDENT: Are there any further remarks? If not, we will now adjourn.

MR. THOMPSON, Peoria, Ill.: Our specifications this year are based entirely on the tests made last year. The city of Peoria at that time made more extensive tests than any other city in the United States. We tested one hundred and twenty-five different lots, from fifteen or twenty factories, and on the results of our tests drew up our specifications, making three requirements—requirements as to abrasion, transverse strength, and absorption. These lots were not samples submitted, but were taken from bricks delivered on the streets. In the abrasion test the bricks were put into the rattler for one hour with three hundred pounds of scrap iron, and revolved at the rate of fifteen revolutions per minute. The scrap iron ranged from a quarter of a pound to five pounds in weight. Mr. Wilkins's results surprise me by the low results of abrasion. Our rattler got to giving very low results of abrasion, and I found that it was so smooth that the bricks, instead of tumbling, went sliding around. To overcome this difficulty I bolted wrought-iron strips on the inside of the rattler, and after that we got very satisfactory results. In connection with the very great difference of opinion of engineers as to what is required of paving-brick, the last meeting of the Illinois Society of Engineers and Surveyors appointed a committee to investigate the question, and recommend to the society standard tests and requirements of brick and sewer-pipe. The rattler was two feet in diameter and three feet long, filled one sixth with brick, and contained three hundred pounds of scrap iron.

MR. HALL, Peoria, Ill.: We have had a great deal of experience in Peoria in the laying of brick pavements, and are as a rule

in favor of the small brick in preference to any other. In the mode of laying them we tried a bed of gravel on a thoroughly rolled sub-base, and then a cushion of two inches of fine sand. We have abandoned it for the reason that when the wet weather comes the water percolates through the brick and sand down into the gravel and you have an uneven surface. It will not settle uniformly, and for that reason we have abandoned the gravel, and have substituted a six-inch concrete base with a two-inch sand cushion.

THE PRESIDENT: Has anybody else any thing to offer? If not, we will now proceed to close.

MR. HERRMANN: Before we close, Mr. President, I would request the delegates to be ready at 1:15 P. M., at the Gibson House. Carriages will be in waiting at that time.

THE PRESIDENT: Any further remarks? Hearing none, I will now declare this meeting adjourned, to meet to-morrow morning at 10 o'clock sharp.

Wednesday, September 11th—Afternoon.

Promptly at 1:30 o'clock the delegates assembled at the Gibson House, and took carriages which were awaiting them for the long ride about the city, mapped out by the Committee of Arrangements. The following route was pursued: Walnut Street to Fourth, to Race, to Seventh, to Plum, to the City Hall. Some time was spent at this building. Leaving the City Hall, the carriages moved to Ninth Street, to Walnut, to Court, to Main, to South Court, to Gilbert Avenue, to Russell, and then to the Art Museum, which building was also inspected. Leaving the Art Museum, the delegates were taken to the Eden-Park pumping station, where refreshments were served. The new water-tower was then visited, and the carriages moved to Park Avenue, to McMillan, to May, to June, to Reading Road, to Oak, to Bellevue, to Molitor, to and through Burnet-Woods Park, to Jefferson Avenue, to Clifton, to La Fayette, to Central, to Clifton, to Glenway, to Carthage Pike, to Erkenbrecher Avenue, and thence to the Zoological Gardens.

The day had been set apart as a holiday for the city employees, and they gave an outing at the Zoo in honor of the society. Promptly at 6 o'clock the delegates assembled at the club-house, where a supper had been prepared for them.

During the evening the famous Bellstedt - Ballenberg Orchestra furnished the following musical programme :

March—"Queen City,"	<i>Bellstedt</i>
Overture—"Festival,"	<i>Leutner</i>
Fantasie—"North and South,"	<i>Bendix</i>
Solo for Piccolo—"Caprice,"	<i>Damm</i>

MONS. EMILE CHEVRE.

"Reminiscences of all Nations,"	<i>Godfrey</i>
Gems of Offenbach,	<i>Tobani</i>
Solo for Cornet,	<i>Selected</i>

MR. HERMAN BELLSTEDT, JR.

Pasquila—"Creole Dance,"	<i>Voges</i>
"Washington Artillery Parade,"	<i>Bellstedt</i>
Variations on "Yankee Doodle,"	<i>Reeves</i>
Burlesque on the "Arkansas Traveler,"	<i>Gilmore</i>
March—"Liberty Bell,"	<i>Sousa</i>

The evening's pleasure concluded with the following splendid display of fireworks:

1. An ascension of monster fireworks balloon, producing a magnificent display of fireworks in its ascent.
2. A discharge of two aerial report shells announcing the commencement of the display. These can be heard for miles around.
3. A grand prismatic illumination of the entire surroundings tributary to the display by the A. L. Due patent prismatic illuminators.
4. A flight of four two-pound display rockets, producing many gorgeous effects in brilliant colors.
5. A flight of two four-pound meteor rockets, releasing hundreds of shooting-stars in wonderful effects.
6. An ascent of three A. L. Due mammoth eighteen-inch shells, producing effects in red, green, blue, and orange.
7. Exhibition piece—"Cincinnati, Queen of the West."
8. A flight of four two-pound electric rockets. After reaching a great height these burst into a cascade of electric stars, which continue their scintillations as they approach the earth.
9. A flight of two four-pound weeping-willow rockets. These, after reaching a great height, with a burst of golden fire descend gently to the ground, representing the long hanging branches of the weeping-willow-tree.
10. An ascension of three A. L. Due mammoth magnesium shells.
11. A flight of one hundred fiery dragons, hissing and squirming in their flight, and on reaching their altitude they explode with a volley of sharp reports.

12. A flight of three mammoth exhibition tourbillions in a fountain of brilliant fire.
13. Exhibition piece—"Welcome, American Society of Municipal Improvements."
14. Pigeon of brilliant fire, flying across a rope and returning to the starting-point.
15. Ascension of three eighteen-inch A. L. Due mammoth shells, representing the weeping-willow-tree.
16. Ascension of A. L. Due mammoth forty-inch shells in peacock-plume effects.
17. Exhibition piece—Large fire wheel. Grand series of seven wheels, largest of which is 16 feet in diameter, producing fire effect 40 feet in diameter.
18. Flight of four two-pound exhibition rockets, producing wonderful colors and contrasting effects.
19. A flight of two four-pound lightning ascension rockets. These rockets, when they reach their altitude, fill a large space with colored fire. After describing a number of eccentric scintillations, disappear with a loud report.
20. An ascension of three A. L. Due mammoth eighteen-inch shells in willow and meteor effects.
21. Ascension of A. L. Due thirty-inch shells in magnificent colored effects.
22. Exhibition piece—"The Acrobat."
23. Flight of four two-pound golden-rain rockets. These are very beautiful in their effects. After reaching an immense altitude they explode and release beautiful golden rain.
24. Flight of two four-pound bouquet rockets. These rockets on reaching their altitude release a mammoth bouquet of colored stars; descending, display a second and then a third bouquet.
25. An ascension of three A. L. Due mammoth eighteen-inch shells. These are certainly one of the grandest productions of the art. They are fired from large iron mortars, and on reaching their altitude they explode and release every color and effect imaginable.
26. A flight of one hundred fiery dragons. These commence with a brilliant discharge of scintillating sparks, finally discharging high into the air a hissing dragon, which disappears with a loud report.
27. Exhibition piece—"Spreading Fan." First showing a folded fan with a beautiful star in colored lance-work over the top, and as it burns the fan gradually opens and the stars revolve, producing one of the most magnificent effects in pyrotechnics.
28. Flight of four two-pound meteor rockets. These rockets, when they reach their height, discharge a number of meteors, which, as they descend, continue to throw out other meteors in great numbers of all colors, producing a wonderful effect.
29. Flight of four two-pound golden-wreath rockets. These rockets,

when they reach their height, produce a golden wreath, which descends in a golden cloud almost to the ground.

30. An ascension of three eighteen-inch A. L. Due shells. These are the finest known to the art, and produce wonderful effects.
31. A flight of three mammoth exhibition tourbillions. These ascend a considerable distance in the air, leaving a very beautiful rotary forming a volume of beautiful scintillating fire.
32. Grand finale: Beautiful aerial bouquet of mammoth size, filling the air with every color known to the art, and with most beautiful effects.

Thursday, September 12th—Morning.

The second day's session was opened promptly at 10:15 o'clock in the morning. The President announced that the Executive Committee had met and amended the constitution, and were ready to make its report. In response to his request the Secretary read the amended constitution, which is as follows:

ARTICLE I.—NAME AND OBJECT.

SEC. 1. The objects of this society, which shall be known as "The American Society of Municipal Improvements," shall be to disseminate information and experience upon, and to promote the best methods to be employed in, the management of municipal departments and in the construction of municipal works, by means of annual conventions, the reading and discussion of papers upon municipal improvements, and by social and friendly intercourse at such conventions, and to circulate among its members, by means of an annual publication, the information thus obtained.

ARTICLE II.—MEMBERSHIP.

SEC. 1. Any municipality within America shall be eligible to membership in this society; likewise any engineer, officer, or director who shall have charge of or supervision over, or be employed as a consulting engineer on, any public or municipal department work. When a municipality has become a member of the society, then any person of such municipality representing any municipal board or department may also become a member.

SEC. 2. Every application for membership shall be in writing, stating the name, location, and department; and, if of an individual, shall also state the age, residence, and position of the applicant.

SEC. 3. Any member who shall have ceased to have charge or supervision of any public or municipal department or work may become an

associate member, who shall enjoy all the rights and privileges of full membership, excepting that of holding office or voting.

SEC. 4. Any member who shall be in arrears for more than one year's dues shall be considered as no longer a member of this society, and his or its name shall be discontinued from the roll by the Secretary.

SEC. 5. Any member may withdraw from the society upon payment of all dues to date, and by notifying the Secretary thereof in writing.

SEC. 6. Any member may be expelled from the society upon the recommendation of the Executive Committee, adopted by a two-third vote of all the members present.

ARTICLE III.—FEES AND DUES.

SEC. 1. Each municipality desiring to become a member of this society may do so by the payment of five dollars admission fee, which will entitle said municipality to as many members to said society representing boards or departments of said municipality as may be desired without any additional admission fee, but upon payment of the dues hereinafter prescribed.

SEC. 2. Municipalities shall not be required to pay any dues; but each individual representing any department of a municipality that has acquired a membership in the society, or any associate member, shall pay three dollars per annum as dues, the same to be payable on or before the date of the annual meeting.

ARTICLE IV.—OFFICERS.

SEC. 1. The officers of this society shall consist of a President, three Vice-presidents, a Secretary, and a Treasurer, each of whom shall be a resident of a different state, and who with the past presidents shall act as an Executive Committee for and in behalf of the society.

SEC. 2. There shall also be elected a Finance Committee, consisting of three members of the society.

SEC. 3. In case of any of the above positions, excepting the presidency, becoming vacant, the President shall fill such vacancy by appointment from the membership.

SEC. 4. There shall be appointed annually the following Standing Committees:

1. Street-Paving;
2. Electric Street-Lighting;
3. Sewerage and Sanitation;
4. Waterworks and Water-Supply;
5. Taxation and Assessments;
6. City Government and Legislation.

The number on each committee shall be three, and the chairman may add such names as he may deem advisable.

ARTICLE V.—ELECTION.

SEC. 1. The officers of this society shall be elected by ballot on the second day of each annual convention, and each municipality shall be entitled to as many votes as it has representatives present.

SEC. 2. The President shall not be eligible for immediate re-election (except by a unanimous vote).

SEC. 3. The officers elected shall assume office immediately after the close of the annual meeting at which they were elected.

SEC. 4. The ballot for any officer may be waived by unanimous consent.

ARTICLE VI.—DUTIES.

SEC. 1. The President shall preside at the meetings of the society and at those of the Executive Committee, and shall perform such other duties as are incumbent upon the office. In the absence of the President, or upon his becoming ineligible, the senior Vice-president shall assume and perform the duties of the office.

SEC. 2. The Secretary shall keep accurate minutes of the proceedings of the society and of the Executive Committee; shall conduct all correspondence; shall issue notices of any meeting of the society not less than four weeks prior to the date of such meeting; shall collect and receipt for all fees and dues, and pay them to the Treasurer quarterly, taking his receipt for the same; and keep accurate account between the society and its members.

SEC. 3. The Treasurer shall receive from the Secretary and safely keep all moneys belonging to the society, giving his receipt therefor; shall pay all bills approved by the Finance Committee or the President; shall keep a correct account of the funds of the society, and submit to it at its annual meeting a report of all receipts and disbursements during the preceding year.

SEC. 4. The Executive Committee shall manage all the affairs of the society, subject to the action and approval of the society at its meeting. All questions in Executive Committee shall be decided by a majority vote, and five members shall constitute a quorum, not less than four of whom shall be officers of the society. The Executive Committee shall meet at least once each year, on the morning of the first day of the annual meeting of the society, and as much oftener as the President may determine.

SEC. 5. The Finance Committee shall meet on the morning of the first day, and previous to the annual meeting of the society, to examine and audit the Secretary's and Treasurer's accounts and annual statements, and report thereon to the society.

SEC. 6. It shall be the duty of the chairman of each standing committee to prepare a report, with the aid of his fellow-committeemen, and submit the same at the annual meeting.

SEC. 7. One afternoon and such other time as may be deemed necessary shall be devoted to sectional work, the chairman of each standing committee acting as chairman of the section. The chairman of each section shall arrange the programme of the sectional meetings in connection with the programme committee of the society.

ARTICLE VII.—MEETINGS.

SEC. 1. The annual meeting of this society shall be held on the second Wednesday in October of each year, in such city as the majority of the members voting shall decide. Selection of place of meeting to be made after the officers shall have been elected.

SEC. 2. At any annual meeting of the society fifty members shall constitute a quorum for the transaction of business.

SEC. 3. Any member with the concurrence of the presiding officer may admit friends to the meeting of the society, but such person or persons shall not without the consent of the meeting be permitted to take part in any discussion.

SEC. 4. All papers, drawings, etc., submitted to the meeting of the society shall be and remain the property of the society.

ARTICLE VIII.—ORDER OF BUSINESS.

SEC. 1. At the annual meeting of the society the order of business shall be as follows:

1. Roll call;
2. Reading of minutes of last meeting;
3. Considering of applications for membership;
4. The President's address;
5. Reports of the Secretary and the Treasurer;
6. Report of the Executive Committee;
7. Report of the Finance Committee;
8. Reports of special committees;
9. Reading and discussion of papers;
10. Election of officers;
11. Selecting next place of meeting;
12. General business.

SEC. 2. All questions shall be decided by vote, and all differences of opinion in regard to points of order shall be settled by parliamentary practice, as set forth in Cushing's Manual.

ARTICLE IX.—AMENDMENTS.

SEC. 1. The foregoing constitution and articles may be amended on or after the second day of any annual meeting of the society by a two-third vote of all members voting; provided such proposed amendment shall have been submitted to the society in writing on the first day of its annual meeting.

THE PRESIDENT: Gentlemen, you have heard the reading of the proposed amended constitution. The question is now upon the articles as they have been read, and we will now take them up, unless otherwise ordered by you.

MR. VAN DUYNE: I move the constitution be adopted as a whole. [Motion seconded.]

MR. HERRMANN: At the meeting of the Executive Committee this morning there is one thing I forgot. Section 4, Article VI, describes the duty of the Executive Committee as follows: "The Executive Committee shall manage all affairs of the society, subject to the approval of the society at its meetings. All questions of the Executive Committee shall be decided by a majority vote, and five members shall constitute a quorum, not more than four of whom shall be officers of the society." As I understand it, the officers of the society shall constitute the Executive Committee. Should not some provision be made, in case some of the officers are absent at the annual meeting, that their places be filled in some manner?

THE PRESIDENT: It is so provided, Mr. Herrmann.

MR. HERRMANN: As I understand it, the article only provides that in case any of the above positions become vacant the President shall fill such vacancy by appointment from the membership. A provision should also be made to provide for the appointment of the Executive Committee in case some of them would not be present at any annual convention.

THE PRESIDENT: You might add in Section 3, Article IV, "In case any of the above positions become vacant, or in case of their absence during the annual convention."

MR. HERRMANN: Unless you provide for that you can not get a meeting of your Executive Committee.

THE PRESIDENT: Do you make that as an amendment?

MR. HERRMANN: Yes, sir. [Amendment seconded.]

THE PRESIDENT: Gentlemen, you have heard the amendment of Mr. Herrmann, that the following words be added: "In case any of the above positions become vacant, or in case of their absence during the annual convention, the President shall fill such vacancy by appointment from the membership." Are you ready for the question? All those who are in favor will manifest it by saying aye. [Carried.]

THE PRESIDENT: Now the question is upon the adoption of the constitution as submitted and amended. Are you ready for the question?

MR. GAMBLE: If I understand correctly, the reading of Section 1, Article II, as to membership, is as follows: "Any municipality within America shall be eligible to membership in this society; likewise any engineer, officer, or director who shall have charge or supervision of any public or municipal department or works." And further: "*When* a municipality has become a member of the society, *then* any person of such municipality representing any municipal board may also become a member." If I understand that correctly, it is this: that unless a municipality applies for and obtains membership in this society, then an individual representing a municipal office in that city can not of his own accord, as an individual, become a member. Is that proper?

THE PRESIDENT: No, sir; the provision in Section 1 as originally submitted provides: "Likewise any engineer, officer, or director who shall have charge or supervision of any public or municipal department or works" may become a member. It provides, though, that if a municipality becomes a member, that in that case any heads of departments may become members by virtue of the municipality having become a member.

MR. GAMBLE: This addition to the section reads: "That when a municipality becomes a member, *then* any officer, etc., of such municipality *may* become a member."

THE PRESIDENT: That provides as to when a municipality has become a member.

MR. GAMBLE: Is there nothing in this that prohibits an individual becoming a member when his municipality has not become a member?

THE PRESIDENT: No, sir.

MR. KEYT, Piqua, O.: I would like to have the section concerning membership read by the Secretary as it now stands before the convention for adoption. I do not clearly understand it. Is this an amendment for the one which has been substituted, Mr. President?

THE PRESIDENT: Hardly, this and the original.

MR. KEYT: This is in connection with the original?

THE PRESIDENT: Yes, sir.

MR. KEYT: May I have the Secretary read it?

THE PRESIDENT: Yes, sir.

THE SECRETARY: "Any municipality within America shall be eligible to membership in this society; likewise any engineer, officer,

or director who shall have charge or supervision or be employed as consulting engineer on any public or municipal department or works." It then refers to the amendment, the second clause: "When a municipality has become a member of the society, then any person of such municipality representing any municipal board or department may also become a member."

THE PRESIDENT: Are you ready for the question?

MR. O'SHEA, Buffalo, N. Y.: We can hardly vote intelligently on this unless we have a little more light. I do not see how we can vote unless we know what it consists of.

MR. HESS, Cleveland, O.: This meeting was called for 10 o'clock sharp, and the members had all been notified to that effect, and as there is business of importance before the society, and the constitution has all been read, I do not see why, on account of the willful absence of some of the members, the proceedings of the convention shall be delayed; therefore I call for the question.

THE PRESIDENT: All in favor of the constitution as submitted and amended being adopted will manifest it by saying aye; opposed, no. [Adopted unanimously.] I thank you, gentlemen. We will now immediately proceed upon the order of business as now adopted. Under the constitution, the order of business on the second day of the annual convention shall be the election of officers, and a motion to set a special hour for that purpose, unless you are ready to take it up now, is in order.

MR. JOHNSON: I move that the hour for the election of officers be set for 8 o'clock this evening, so that some of the members who are not as yet members of the society can give their names to the Secretary and pay their dues.

MR. HERRMANN: I offer as an amendment that it be made at 9 o'clock to-morrow morning.

THE PRESIDENT: Under the constitution, it must be to-day. Are you ready for the question?

MR. KERR: Some members may wish to take the trains this evening, and if the hour is so late as 8 o'clock they can not be here for the election of officers. If some other hour could be set, it would be more desirable.

THE PRESIDENT: The afternoon will be taken up by the Committee of Arrangements.

MR. HESS: Under the circumstances, I will amend the motion to proceed with the election of officers at once.

MR. STATES: I offer an amendment, that a committee on nomination be appointed to bring in a list of the officers.

THE PRESIDENT: Gentlemen, you have heard the amendment to the amendment, that a committee on nomination be appointed.

MR. MUNRO: I can not see where the gentleman's motion would be an amendment to the former motion. I believe that one gentleman rose here and made a motion that it be 7 o'clock; it was amended, I believe, to 8 o'clock; and it was amended, I believe, that we proceed now at once; and I rise to a point of order that the gentleman's motion is out of order.

THE PRESIDENT: And I will sustain you in your point.

MR. MUNRO: I make an amendment to the motion that instead of 8 o'clock we meet at 7 o'clock this evening.

THE PRESIDENT: There are already two amendments. Are you ready for the question?

The yeas and nays being called for, the amendment was carried.

THE PRESIDENT: The question now is upon the motion as amended, that the hour of 7 to-night be set as the special hour for the election of officers. All in favor will manifest it by saying aye. [Carried.]

MR. STATES: I move that a committee of five on nomination of officers be now appointed.

THE PRESIDENT: You have heard the motion, that a committee of five on nomination of officers be appointed. Are you ready for the question? All in favor will manifest it by saying aye. [Carried.]

THE PRESIDENT: How shall the members be appointed?

SEVERAL VOICES: By the chair.

THE PRESIDENT: The chair will not appoint the committee; I would like to have these nominations come from the floor.

The members of the convention thereupon appointed the following gentlemen: Messrs. Wright, of Cleveland, O.; States, of New Haven, Conn.; Munro, of Omaha, Neb.

After these gentlemen had been nominated, a motion was made and carried that no more than one gentleman be selected from any particular state.

The following two gentlemen were then added to the committee—Mr. Jackson, of Chicago, Ill., and Mr. Hathaway, of New Bedford, Conn.

Mr. DeVilbiss moved that the nominations be closed, which was carried.

MR. STATES: I would move that the committee present two or more names of different cities for the next annual convention.

THE PRESIDENT: You have heard the motion, that the nominating committee present the names of two or more cities for the next annual convention. Are you ready for the question? All in favor will manifest it by saying aye. [Carried.]

THE PRESIDENT: The next order of business is the reading of papers. I have the pleasure, gentlemen, of presenting to you Mr. J. W. Hill, of Cincinnati, who will read a paper on "Quality of Public Water-supply."

QUALITY OF PUBLIC WATER-SUPPLY.

JOHN W. HILL, CONSULTING ENGINEER, CINCINNATI, O.

There is no question of more importance to us when viewed from a hygienic standpoint than the purity of our public water-supplies, especially with reference to the propagation of typhoid fever by means of sewage-polluted drinking-water. In the United States alone the health statistics from the largest cities show at the present time an average annual loss of more than 35,000 lives by typhoid fever, or about one in ever 2,000 of the current population. Considering that this disease is due altogether to preventable causes well understood by sanitarians, it would seem that such an alarming loss of human life should direct the attention of public officials and hygienists to prompt and vigorous measures to check its ravages, or wipe out the disease altogether.

The pumping of water for domestic uses from a source known to be polluted by sewage or otherwise can not be too strongly condemned.

Water is an essential of human existence. Ninety per cent of the liquid portion of the blood is water, and of the corpuscles or disks in the circulation nearly seventy per cent is water. Of all the many articles of diet upon which we subsist, none is so important to the support of life as water. With all other articles of subsistence we are usually very careful not only to demand the best, but to insist that they are absolutely safe to take into the human system. With water, however, we drink whatever comes most conveniently to hand, with no inquiry and seldom a thought as to its fitness for the purpose to which it is applied in the animal economy; and yet one of the most dangerous of diseases—typhoid fever—can be established in the human system through the medium of drinking-water. For even in the few instances of its being traced to the distribution of an infected milk or other article of diet, it has been shown that the remote cause was a typhoid-tainted water.

The question of procuring a satisfactory supply of potable water for large communities is well understood by the engineers engaged in this line of work. Sources of supply which ten or fifteen years ago were thought to be safe in a sanitary aspect are now open to grave suspicions of quality, and it is not extravagant to assert that few of the larger cities of the country enjoy a source of public water-supply which satisfies the most ordinary requirements of a potable water.

SEWAGE POLLUTION.

No city in the United States has made a stronger effort to protect the watershed from which it obtains its water supplies than Boston, and but for this vigilance and great expense to diminish the sewage pollution of its water sources the death-rate of the city from typhoid fever would probably be among the highest in the country. The increased sewage pollution of rivers and lakes which might furnish a safe drinking-water is partly responsible for the difficulties surrounding this problem. But apart from the special sewage pollution by organized communities there is a pollution of streams and lakes from the ordinary surface drainage of agricultural watershed which often renders the water of such unfit for drinking purposes.

Several years ago, in discussing this question, the speaker took the ground that as the proportion of water used for drinking purposes was one half per cent or less of the whole quantity consumed by the takers from a public source, the better plan was not to attempt to secure the whole supply as of potable quality, but to render any water available fit for drinking purposes by domestic filtration. Later experience satisfies me that this plan will not answer for several reasons:

1. All consumers of public water-supply can not or will not use domestic filters.
2. There is no domestic filter which is absolutely proof against the passage of disease germs and the toxic properties in a polluted water.
3. Even if a satisfactory filter was obtainable, it is doubtful if the average householder would give this the attention it would require to keep it at all times in condition to act as a safeguard.

In view of which I have reached the conclusion that if the consumer is to have a safe drinking-water, it must come to him in this condition through the public water-mains. In other words, the matter of purity must be looked after by the municipal corporation. The prevalence of typhoid fever in many cities having a public water-supply is evidence that the water now furnished to consumers is unpotable, and that the municipal corporations are furnishing to their consumers the bacillus of Eberth, or the specific virus of typhoid fever.

TO DESTROY BACTERIA.

It is too frequently asserted or implied in text-books and reports on sewerage that the noxious properties in sewage are destroyed or safely

mitigated by proper dilution; but if sewage should be the carrier, as it often is, of pathogenic germs, how can dilution remove them? It may reduce the number per unit of volume of the mixed sewage and water, but the germs are still there, and when taken into the system through drinking-water may produce just as serious results to just as many people as if no dilution had occurred. Dilution may reduce the chances of any single individual imbibing a fatal germ, but the germ itself will be quite as dangerous when it is imbibed.

In discussing the question of water pollution, what is desired in connection with our drinking-water is not so much that the germs be reduced to a small number as to eliminate altogether those of pathogenic character. (A man in jumping a brook must accomplish the feat in one leap. He can not jump half way across and rest, and then jump the other half at his convenience. So it seems to me in dealing with the subject of water purification; we can not partially purify it and then deliver it to the consumers without great risk.) The bacteria or other cause of disease must be wholly eliminated, or we will be in the predicament of the man who attempts to cross the brook in two leaps. We will be worse off than if we had remained on the hither side; for a partial purification of our drinking-water will beget a feeling of security which is false, and may lead to serious results, while no attempt at purification at all will leave us on our guard against a polluted water, and cause us to avoid the drinking of it altogether.

In reports of filters tested for the reduction of bacteria it is customary to state the condition of the water after filtration in the remaining bacteria cu. cm. These are given as the average per cu. cm., and sometimes the number after filtration may be as low as three or four, and I have seen it stated in some reports as low as one per cu. cm. An ordinary drinking-tumbler contains half a pint, or about two hundred and thirty cu. cm., and with the best of filtered water so low in bacteria as one or two cu. cm. a person may imbibe from two hundred and fifty to five hundred bacteria in a single glass of water, some of which may be pathogenic, and produce typhoid fever or some other disease.

INFECTED WATER.

A careful investigation of the subject of bacteria in a water-supply seems to lead to the following conclusion.

If the source of water-supply is beyond the reach of sewage contamination, the probability of finding pathogenic bacteria in such water is very remote, because those of which we stand in awe, the typhoid and cholera germs, are not indigenous to water, but are always imported into it, generally from sewage sources. Upon the other hand, if the water source be exposed to sewage contamination and bacteria are found in such water, it should promptly be condemned for drinking purposes. It is a singular fact that in several instances where pathogenic bacteria have been found in water (excepting, of course, sewage effluents), the number of bacteria

of all kinds per unit of volume of the water is small. A statement, therefore, that by a certain process of purification the number of bacteria in a given water has been reduced from say one thousand to four cu. cm. is not convincing proof of the capacity of such process to eliminate disease germs, because four bacteria per cu. cm. mean upward of one thousand in a single tumbler of water, and among one thousand bacteria left in any sewage-polluted water there is a possibility that some may be pathogenic germs, provided such were in the water before treatment.

To some people the communication of disease through infected water seems to be mysterious, and because it does not come in some tangible form they are disposed to doubt the transmission of infectious disease by this means altogether; and to those who recognize danger in polluted water few are aware of the number of germs known to be pathogenic to man or animals which have already been found in drinking-waters, some of which were not suspected of being the carriers of infection. In Eisenberg's list of bacteria possessing pathogenic properties twelve kinds are described which have been found in water, while Professor Frankland enumerates twenty-three species of such bacteria found in water. Of these the most formidable are the germs of cholera and typhoid fever. And as cholera rarely visits this country, typhoid is the principal pathogenic bacteria with which we have to deal.

CAUSE OF TYPHOID FEVER.

The mass of evidence on the cause of typhoid fever abroad and in this country is to the effect that it is invariably a water-carried disease. And in those epidemics where milk, butter, watercress, oysters, or other articles of diet have been the immediate distributors of the germ, water has been the original habitat of the typhoid bacillus, from which it follows that if the typhoid germ is kept out of our dietetic water-supplies, typhoid fever would cease to exist. In speaking of a dietetic water-supply, this is held to include not only drinking- and cooking-water, but such water as may in any way be brought in contact with articles of diet.

In support of the broad assertion, that "if the typhoid germ is kept out of our dietetic water-supplies typhoid fever would cease to exist," I desire to quote from three distinguished American authorities upon this subject.

"Out of every one hundred cases of typhoid fever, ninety-nine come from infected drinking-water." (A statement by Dr. Cyrus Edson, Commissioner of Health of New York, in the New York Tribune December 10, 1894.)

"The disease in which the death-rate of Lawrence, Mass., especially exceeds that of any other cities are typhoid and diarrheal diseases, both of which are regarded as especially dependent on the water used for drinking." (From a pamphlet entitled "Typhoid Fever in Its Relations to Water-supplies," by Mr. Hiram F. Mills, C. E., Boston, Mass., 1891.)

"In parts of Germany, where the water-supplies are controlled by government, and are uniformly of excellent character, the death-rate

from typhoid fever has gradually declined to almost nothing." (A statement made by Mr. Allen Hazel, late chemist to the Massachusetts State Board of Health, in his discussion of a paper by the speaker on "Bacteria and Other Organisms in Water," New York, 1895.)

Of course, common belief upon any abstruse subject is not always founded upon fact. But of those who have given the cause of typhoid fever most attention, substantially all are agreed upon an infected water as being the most probable cause of the continuous case and death-rate from this disease.

INTERESTING STATISTICS.

The presence or absence of fish in water has often been mentioned as a test of quality. Certain kinds of fish, like the carp, for instance, are often found to flourish in water known to be polluted by organic wastes; while others, more fastidious in their tastes, like the mountain trout, are never found in any but the clearest and naturally purest upland waters. In all cases, however, there must be enough organic matter in order to support even fish life, and an estimate of the quality of any water-supply from the presence or absence of any particular kinds of fish would only be relative. A water wholly destitute of organic matter could not support fish life, while in a water heavily polluted with sewage wastes certain kinds of fish would die for lack of free oxygen. It is held by the most experienced observers in this line that, after all, the typhoid fever death-rate of any city is the best test of the quality of the public water-supply, and, as interesting information in support of this view, I desire to call your attention to some figures from the typhoid-fever statistics from sixty of the largest cities of the United States and Europe for the past five years. The figures which I will quote will be the number of deaths per 100,000 of population living. From the table which I have before me the lowest death-rate for the past five years is found at The Hague, in Holland, where in 1893 the loss was but two per 100,000 of population living, while in Chicago for the year 1891 the loss was one hundred and sixty, or eighty times as great as that of The Hague. London, with its heterogeneous population of over 4,000,000, and with districts like Shoreditch, Clerkenwell, and Whitechapel, among the people of which even the instincts of hygiene are unknown, during the past five years has never had a typhoid-fever death-rate in excess of sixteen per 100,000 of population, and in 1892 the death-rate from this disease was as low as eleven. In 1892 the death-rate of Chicago was one hundred and four, or nine and a half times that of densely-populated London. Referring to the city of Newark, N. J., before the new source of water-supply from the Pequannock River was brought into the city, the death-rate from typhoid fever ranged from forty-five to eighty-one per 100,000 of population. After the new source of supply was drawn upon the death-rate (1894) fell to fifteen per 100,000 of population, or about the same as the average rate for the past five years for London. Berlin, which draws its water-supply

from the River Spree and Lake Tegel, has at no time during the past five years had a death-rate in excess of ten, while in 1894 the death-rate from typhoid fever was as low as four per 100,000 of population.

IN WASHINGTON, D. C.

Meanwhile Washington City, the capital of our country, which draws its water-supply from the sewage-polluted Potomac River, and delivers it to its consumers in the same condition in which it is taken from the original source, at no time during the past five years has had a death-rate from typhoid fever of less than sixty-six, and at times as high as eighty-three per 100,000 of population, or an average for the past five years of nine and a half times that of the city of Berlin. Vienna, which draws its public water-supply from springs sixty miles distant, in the Schneeberg, has had an average death-rate for the past five years from typhoid fever of seven, while Pittsburg, which draws its water-supply from the Allegheny River, for the same time has had an average death-rate of ninety-two, or thirteen times that of Vienna. Munich, whose public water-supply is obtained from springs, during the past five years has had an annual death-rate from typhoid fever of seven, while Lawrence, Mass., which draws its water-supply from the Merrimac River, during the past five years has had an annual death-rate from typhoid fever as high as one hundred and twenty-three in 1890, and as low as forty-eight in 1894; or, taken for the entire period of five years, nearly fourteen times that of Munich.

Some objection, possibly, will be made to a comparison of the public water-supplies and typhoid-fever rates of the German and American cities, owing to the generally large consumption of beer and presumably small consumption of water as a beverage by the people of the foreign cities. The per capita per annum consumption of beer is said to be greater in Munich than in any other city in the world, and is stated at one time to have been as high as one hundred and twenty-eight gallons. It is a well-known fact that great quantities of beer are consumed in several of the large cities of this country, but few would suggest that the total consumption of domestic beer in the United States amounted to 33,000,000 barrels during 1894, which would allow every man, woman and child from fifteen to sixteen gallons per capita. It is in the principal cities, however, where the largest consumption occurs, and from imperfect statistics, although at the present time the best obtainable, the local consumption is given as follows:

Gallons per Capita per Annum.		Gallons per Capita per Annum.	
Boston	65	Cincinnati	80
New York.....	78	St. Louis.. ..	93
Brooklyn.....	60	Cleveland	46
Philadelphia.....	51	Buffalo	65
Chicago.....	54	Milwaukee	105

These figures are derived from a table in the *Brewers' Handbook* for 1894, and are not presented as an accurate statement of facts; but, taken even as very rough approximations, they serve to show that we are not far behind our friends of the German cities in the worship of King Gambrinus. Doubtless the use of beer is more general in the cities of Germany than here, but that they do not depend alone on beer is shown by their extreme solicitude for the quality of their public water-supplies.

IN OTHER CITIES.

A moment's reflection should convince any one that cities like Cincinnati, Pittsburg, St. Louis, Chicago, and many others in this country, which take their public water-supplies from sources known to be receptacles or channels for the discharge of the sewage of hundreds of thousands of people, and deliver this water to their consumers, with none at all or insufficient purification, can not expect to escape the penalty for such flagrant disregard of the fundamental laws of health.

Consider that the death-rate from typhoid fever during 1894 for this city, as an example, was over three times that of London, eight times that of Hamburg, ten times that of Vienna, twelve times that of Berlin, seventeen times that of Christiania, and twenty times that of Munich, and then decide whether there is not just cause of complaint of a public water-supply which leaves its mark in history at such an awful cost of human life and suffering.

In my paper on "The Sterilization of Our Drinking-water to Prevent Typhoid Fever," read at the Eighth International Congress of Hygiene and Demography, held at Buda-Pesth, September, 1894, I endeavored to show that absolute safety from disease germs in a polluted water-supply was to be had only by filtration, to remove the grosser impurities, and subsequent distillation to eliminate all bacterial life and toxic properties in the water; and, by illustration, for a city about the population of Cincinnati when all the contiguous villages have been annexed, deduced an annual per capita cost for fixed charges and operating expenses of about one dollar, or a cost per gallon of water treated of about one tenth cent.

I estimated at that time that about two and a half per cent of the total water-supply was used for drinking and other dietetic purposes.

Many objections have been raised to this method of securing and distributing a potable water; the only one worthy of consideration, however, is the cost; and with a view to reaching better knowledge than most of us possess on other methods of water purification, and in the light of the necessity now, and perhaps at all times, of this city being compelled to take its water-supply from the sewage-polluted Ohio River, I have during the past year sought exact information upon the effect of sedimentation in large, deep reservoirs, such as we have in the waterworks of Liverpool and Boston, and upon carefully conducted

sand filtration as practiced in the Berlin and Hamburg waterworks, and in several of the cities of Holland, and from this I feel that it is possible, by combined sedimentation, and what I would term multiple filtration through thick beds of graduated sand, to produce from the polluted water of the Ohio River as good an effluent as that supplied to any foreign city.

MR. VAN DUYNE: Mr. Chairman, the ideal water mentioned in this paper is very nearly that of Newark, N. J. Our city changed from a polluted river supply three years ago to a mountain supply, and the chairman of our Water Committee, Mr. Bailey, if he is in the room, has a brief paper prepared, describing our water-supply. It will not take over five minutes to read it, and I think the members will be interested in hearing it read.

MR. RATLIFF, Richmond, Ind.: In confirmation of what the gentleman stated in his most excellent paper, I wish to make a short statement in regard to our experience in water-supply at Richmond. We have at this time in that little city of about twenty thousand inhabitants more than one hundred cases of typhoid fever to-day. Some observations have been made, and some careful examinations as to the origin of those cases among the people who are using water from wells. The water-supply system of our city, we think, is very pure; it consists entirely of spring-water; but very little of it sees the daylight until it gets into our city; but our city having been well supplied with wells ever since its existence, a great many people prefer to use the well-water instead of the water-supply system, and the impression seems to prevail in our city that the well-water is accountable for the large number of cases of typhoid fever we have in our city to-day.

MR. HATHAWAY, Marietta, O.: I would like to inquire in regard to the purification of water by its flow in the river during the cholera epidemic in the old country some years ago. I think it was in Hamburg. It was stated by German scientists that the water of the Elbe purified itself in flowing seven miles, and therefore the cities more than that distance below the contagion were not in danger. I would like to ask your opinion in regard to this matter.

MR. HILL: I think that I can answer Mr. Hathaway's question best by referring to our Ohio-river water. From recent experiments which I have made with sterilized river-water, I find that the bacillus of typhoid fever lives in it over sixty days; it perishes somewhere between sixty and ninety days, and you can readily conceive that in sixty days it can come from the headwaters of the Allegheny and

Monongahela rivers, and reach every city on the banks of the Ohio and Mississippi rivers. There is some small purification of river-water by flowage, and this is accomplished partly by sedimentation and partly by oxidation; but I do not believe that any sewage-polluted water will ever purify itself by flowing any distance within the limitations of our rivers. The experience of the Rivers Pollution Commission of Great Britain leads to the conclusion that there is no river in England, at least, which is long enough to purify itself of any sewage pollution it may have received even at its source. I know it to be a fact that many of our text-books tell us that in ten miles or in twenty miles polluted water will be purified to that condition in which it is fit to be drank; but my experience leads me to believe that this is a grave mistake; that the purification of a polluted stream can not be measured in distance; it might be measured in time; and when I tell you that after several years of experiment along this line I find the typhoid bacillus will live in our water for over sixty days, you can conceive that in two months time the Ohio River, if it were possible, will travel a great distance. With an average current of four miles per hour during the lifetime of the bacillus, it may be carried by the current over a distance of six thousand miles from its original source.

MR. WILKINS: Have you ever made any estimates, so as to give any comparison between the cost of filtering the entire water-supply of Cincinnati and two separate systems, one supplying filtered water for domestic consumption and the other for unfiltered water for fire and manufacturing purposes?

MR. HILL: In my paper I left out the item of cost altogether; I simply considered the hygiene of the question. I think every city should have two water-supplies; one that furnishes the water for drinking, cooking, and such domestic purposes as occur about the kitchen, and the other for manufacturing uses and for the flushing of sanitary appliances.

MR. WILKINS: Would not the interest on the cost of the two pumping plants and two pipe systems more than or at least offset the greater cost of filtering the entire supply?

MR. HILL: I have not the cost. I have devoted considerable time to this question of sterilization of water by heat. It has been an interesting study, and with the aid of my friend Mr. Whinery we have brought it to a practical system. Every city should have a supply for drinking and cooking purposes of water sterilized by heat.

But what I say in the paper just read is that I believe the Ohio-river water can be made by other methods than sterilization quite as good as that of any foreign city, and if it was made as good as that of The Hague it would be just twenty-five per cent better than it is to-day.

MR. KEYT: Mr. Hill, would not the sand be so affected in time as to be useless as a medium of filtration?

MR. HILL: You understand, gentlemen, that in speaking of a sand filter I have in mind the form of bed that is largely used abroad, which may have an area of an acre or more, and to answer the question that you raise it is customary to pass the water through such a bed until the depth of water over the surface reaches a given head, say three or four feet; then to stop that bed and clean it. About all the bacteria and other matter intercepted by the filter is found right on top of the sand bed; that sand is then washed after having been scraped off, and is put back on the bed, or sometimes, as in Holland, new sand is taken as being cheaper than washing the old sand. But while it is true that in due time the filter clogs, the clogging is to be taken as an evidence of work, and the upper layer of sand from time to time must be taken off and cleaned, and then put back. In some instances this is done by special mechanical appliances. The layer of sand removed is usually about one half or five eighths of an inch, but about all the material intercepted is found in the upper one quarter inch of sand.

MR. CAPPELEN: I would like to ask what about filtration from an underground source or system for a city of say about fifty thousand population?

MR. HILL: The objection to an underground source is that you can not always know where it has its origin. If one could be sure that the underground source was not open to contamination, no objection on sanitary grounds could be taken to it. But, as you are aware, in nearly every large city of this country it is out of the question to look for a sufficient quantity of water from underground sources. Considering Cincinnati as an example, we consume fifty millions of gallons of water per day, and it is quite impossible to expect this amount of water from ground sources in this locality. Convenience, at least, compels us to look to the Ohio River as our source of supply, and the question which naturally arises in connection with the Ohio River is, What shall be the method of treatment, and what will be the

cost in undertaking to render this water fit for use? Referring to the city of Dayton, Ohio, which depends altogether upon ground-water from a system of driven wells, a city of eighty thousand population, I do not believe that any surface-water can compare with this in quality; but upon the broad question of ground-water, there is often an objection to its use for domestic purposes, from the fact that it may at some point be open to sewage contamination without our knowledge.

The President here presented Mr. Bailey to the convention, and the gentleman read his paper, which was as follows.

WATER-SUPPLY OF NEWARK.

HENRY E. BAILEY, COMMISSIONER OF PUBLIC WORKS, NEWARK, N. J.

The city of Newark is blessed beyond most cities of its size in having an abundant and pure supply of water, which is diverted from its natural channel quite beyond the possibility of contamination, and delivered to the city reservoirs by gravity.

The method of obtaining such supply was arrived at in rather a novel way in regard to the construction of such works, the contract being awarded to a company (who already owned or controlled most of the water-rights in the vicinity of the city of Newark) under a general agreement to construct the necessary works, procure all riparian rights, and furnish the city of Newark with a wholesome water-supply of fifty million gallons per day for all future time; they having already made certain propositions as to the watershed they would develop and the storage reservoirs they would construct.

Since the completion of the work they have been supplying the city of Newark with all the water which we have needed, which averages about twenty-one and a half million gallons per day, this being equivalent to one hundred gallons per capita. But we are at liberty under the terms of our agreement to use twenty-seven and a half million gallons per day until 1900, when the total supply and works will be under the control of the city. The ownership is now vested in the city, but the company which constructed the work is to take care of the same until the year 1900.

WATERSHED.

Our watershed for this supply embraces some sixty square miles of area, located in the hills at an average elevation of about one thousand feet above sea-level, and being about forty miles from the city by railroad. The development consists of two large storage reservoirs, having a storage capacity of one hundred and twenty days' supply at the rate of fifty million gallons, and an intake dam. From this intake the daily

supply is conducted to our main distributing reservoirs through twenty-one miles of four-foot steel pipe, and to our high-service reservoir by a branch from this line of some five miles of three-foot riveted steel pipe. This was one of the first supply mains of any extent in which the use of riveted steel pipe was tried, and among some of the other and novel features of this pipe-line is the use of several Venturi meters for the measurement of the entire supply, the invention of Mr. Herschel, who is engineer for the company furnishing the supply. There are in use two forty-eight-inch meters and one thirty-inch meter, by which the entire delivery to the city is constantly measured, and the loss of pressure due to their use, it is claimed, is very slight.

COST OF THE SUPPLY.

All good things come high, and we have necessarily had to pay a good round sum for our supply; not, however, more than the usual cost to obtain satisfactory results. There has been paid upon this contract three and a half million dollars, and if the work proves satisfactory in 1900 the city will take entire charge upon the payment of an additional two and a half million dollars. There are, however, several considerations that may necessitate the resort to legal settlement between the city and the company. But these controversies not having been settled as yet, we need not enter into their discussion at this time.

Our distribution is divided into four different levels; the low, middle, and high being supplied by the distributing reservoirs, and what is called the "special high" by direct pressure from the conduit-line.

We had on January 1st two hundred and ten miles of pipe and seventeen hundred hydrants in the city. During the present year contracts for approximately one million dollars for pavements having been let in the city of Newark, and coming just at the time when it is necessary to relay and re-arrange a large portion of the distribution, has entailed an immense amount of work on the Water Department. We have determined to replace all pipe of less than six inches in size by six-inch or larger sizes. A large portion of the old distribution having been in for over twenty-five years, it has been necessary to relay mains on almost every street where pavements were to be laid, and we are now employing about two hundred men in this work.

It is the aim of the present board to place the waterworks in first-class condition throughout the city; but the above condition of affairs, causing, as it does, such a large expenditure, will be a heavy drain on our resources; but it is certainly economy to attack the work on a broad basis. Our new supply has been in use since 1892. Previous to this time the city's water was obtained by the costly method of pumping from the Passaic River. It was necessary to maintain two pumping-stations, and when the relative qualities of the two supplies are considered, and the cost of maintaining pumping-stations, there can be no question as to the relative values of the two methods of supply.

An additional consideration, which is often lost sight of in comparing questions of this nature, is the very marked improvement in the health of the city due to a pure supply; for, on account of the population along the Passaic above our intake, this supply had become very foul. We feel very proud of our city, not only on account of our pure water-supply, which no community can well afford to do without, but also on account of its many and varied manufacturing interests, and that in addition it is very markedly a city of homes, in which a large portion of the population own their own homes, and consequently take a deep interest in all matters relative to the public welfare; and it is our object, as representatives of such people, to consider their good by giving them the best results in public work at as low a cost as is commensurate with good workmanship, and for that reason we very gladly join hands with you in any effort to arrive at the best and most economical method for the administration of the city's affairs.

MR. CAPPELEN: Mr. President, I would like to ask Mr. Hill a question. In Minneapolis during the winter-time the Mississippi is in fairly good condition, but from April until September it is very bad—that is, outside of any sewerage pollution—that is to say, we have as high as nine tenths of albuminoid ammonia for one million parts, and some twenty hundredths of free ammonia during the summer months. Now, I would like to ask you if the chances for the disease-breeding germ is not by far more severe when you have so much albuminoid ammonia in the water?

MR. HILL: Of course the bacteria in water require very little to live on; they can not subsist in water wholly destitute of organic matter. I find material especially favorable to the growth of the typhoid bacillus in the water of the Ohio River. I do not think it is true that the typhoid bacillus flourishes best when the water is most polluted, but rather when the ordinary water bacteria are at a low ebb. There are certain hardy species of bacteria found in waters which will drive out the typhoid bacilli, and it has been suggested in some German work along this line that we may eventually discover which of the water bacteria are particularly antagonistic to the typhoid germ, and by putting these in a water infected with the typhoid bacillus we may kill the latter; but unfortunately there is no practical information upon this at the present time. It is plain, however, that if we take a heavily-polluted water and sterilize it, all bacterial life will be killed; but we do not know at the present time which of the water bacteria are most inimical to the life of the typhoid germ. I think, in the case that Mr. Cappelen mentions, that the

danger to health is not measured at all by the amount of ammonias in the water.

THE PRESIDENT: The next paper will be by Mr. Holton, of Indianapolis; and I hereby take pleasure in introducing to you Mr. Holton.

STREET AND SEWER WORK OF INDIANAPOLIS.

BY W. B. HOLTON, CHAIRMAN BOARD OF PUBLIC WORKS, INDIANAPOLIS, IND.

GENTLEMEN OF THE CONVENTION:

An act of the General Assembly of Indiana, approved March 6, 1891, gave to Indianapolis a special charter, since which time the operation of her municipal affairs has been revolutionized. By the passage of our city charter the Mayor was empowered to appoint (and remove at his pleasure) three municipal boards, one of which is the Board of Public Works, consisting of three members.

The requirement of the charter, that not more than two of the members of each board appointed by the Mayor shall be of the same political party, has done much to increase the efficiency of our city government, in that it removes from it that element of partisan politics which in so many instances is a curse to a municipality, and perhaps particularly so in our city, owing to its almost equal division between the two great political parties.

Much of the progress which I claim for Indianapolis in the past four years is due largely to the fact that its affairs have been conducted on broad business principles, and for the additional reason that no member of a board is subject to the whims or dictates of political bosses or ward managers. When, under the law, you can hold the mayor of a city personally responsible for the proper conduct of the city's business, as the people are able to do in the city which I represent, it can not but result in a more rapid advancement of her interests in every respect.

The Department of Public Works has under its jurisdiction the control and regulation of street-building, sewer construction, the cleaning and repair of highways, as well as the management of the public lighting and water system for the city. Indianapolis, under the new order of things, has grown from a city having a population of 107,000 in 1891 to a city of about 175,000 inhabitants at the present time. This is due, in part, to the advancement made in the building of good streets, the construction of public sewers, and the improved sanitary condition of the city.

As I have the honor to address the convention more especially on the subject of our experience in street-building and sewer construction, I will confine my remarks to these matters.

In 1891 there was less than two miles of improved roadways in our city. To-day we have forty-five miles of improved streets, of which

twenty-five miles are asphalt, fifteen miles brick, and the remainder of cedar block and macadam.

Before and since I have had the honor to be connected with the city government there has existed much controversy as to what constitutes the best permanent improvements that can be laid.

In the introduction, in 1891, of brick pavements in Indianapolis, a selection of what has proven to be inferior brick was made by the Board of Public Works. An experience of three years has demonstrated to the satisfaction of the city officials and all interested property-owners that no greater mistake could have been made than to select a poor quality of brick for street-paving purposes. Such a street will in two years become worse than a bowlder road in the same length of time. Fortunately for us we have but a mile or two of such pavements. I trust the cities represented here will profit by the experience of Indianapolis, and in the construction of brick streets only use the best material obtainable. The Board of Public Works first appointed provided in their specifications that only brick $2\frac{1}{4}'' \times 4\frac{1}{4}'' \times 8\frac{1}{4}''$ should be used. Experience has shown us that such sized brick will wear faster and the roadway become rough sooner than where a larger brick or block is selected. We have chosen for use the present season a block $3'' \times 4'' \times 9''$. Our method of construction has been, on the principal business and residence streets, to lay the brick surface on a six-inch Portland cement concrete foundation, with a two-inch cushion of sand between the brick and concrete.

Last year there was constructed some six or seven squares of cedar-block pavements—the blocks selected being cylindrical in form, laid on an eight-inch broken stone foundation, thoroughly rolled. This pavement has been down for a sufficient time to demonstrate to the board that such a pavement is not desirable. We are laying some cedar-block pavements in Indianapolis this season—some two miles in length—but the blocks are rectangular in shape, and laid on a six-inch concrete foundation.

We are experimenting at the present time in the construction of two miles of macadam roadway—that to be laid on Capitol Avenue, from Ohio Street to Twelfth Street, one of the main thoroughfares of the city. The demand has come from many of the owners of property for the building of a boulevard drive, and we have endeavored to meet this sentiment. Its trial for a few years will demonstrate whether the people of Indianapolis will favor the continuance of such improvements.

Much contention has existed in our city as to what character of asphalt should be used for street-paving in order to obtain the best results. The use of what is known as the "coal tar" or "vulcanite" pavement was at once abandoned by the Board of Public Works first appointed to office. The board provided in the specifications for asphalt streets that nothing but the Pitch-Lake asphalt, mined directly from Pitch Lake in the island of Trinidad, should be used.

During the years of 1891 and 1892 companies representing and dealing in the "overflow" or "land" asphalt made strenuous and determined efforts to secure the admission of their material. Much evidence was adduced to show that such asphalt would make an improvement equally good and equally lasting as that made with Pitch-Lake asphalt. After a full investigation and consideration of the evidence produced, the department unanimously ruled against the introduction of the "overflow" or "land" asphalt. It was the decision, that while it would be possible to lay a good and lasting pavement with this material, the opportunity for making inferior improvements with it was too great to allow of any experiments. This decision has been adhered to to the present time.

In the spring of 1893 a number of responsible business men of our city formed a company securing the right to handle the Bermudez asphalt. They came before the board, urging the merits of this material. A thorough investigation was made by the board and the city engineer as to the claims made for the Bermudez asphalt. Our engineer visited the cities of Utica, N. Y., and Detroit, Mich., in both of which this pavement had been laid, and he reported to the department that he could see no difference between the Bermudez and Trinidad asphalt so far as appearances were concerned. The information obtainable decided the board in favor of the admission of Bermudez asphalt, and we have in the two and a half years since its introduction laid over fifty thousand square yards of this pavement.

During this present season efforts have again been made to secure the introduction of the "overflow" asphalt, as well as to permit the use of what is called "Mexican" asphalt. Another thorough investigation was again had, but the department has refused to allow the use of either, fearing that such a step would result in a deterioration of the quality of our asphalt pavements. We have no reason to regret the introduction of Bermudez asphalt, as the pavements laid with it are, to all appearances, as good as those in which the Pitch-Lake asphalt has been used.

We have some beautiful asphalt roadways. They are broad, well drained, well shaded, kept clean, and are in uniformly good condition. There is a growing sentiment in favor of asphalt as against brick, and it is now an exception when a brick pavement is laid on any of the principal residence or business streets of the city.

As to method of construction the present season of permanent roadways, our pavements have been laid, unless on a very light-traffic street, on a six-inch Portland cement concrete foundation. Some demands have been made by the property-owners for the use of artificial curb, and in some instances the board has selected this. We believe, however, it is best suited for residence streets, and have only encouraged its use in such portions of the city. While Indianapolis has laid a few of the light standard asphalt pavements—four inches of concrete and two

inches of asphalt—such construction is not the rule, the standard pavement giving the most satisfactory results and has been most generally adopted.

The first important work undertaken by the Board of Public Works under the new system of government in Indianapolis was to map out a correct sewerage system. The services of Rudolph Hering, of New York City, an engineer of high authority on this subject, were secured, and with the assistance of the engineer employed by the city a full and comprehensive report was submitted to the board in June, 1892. The report of Mr. Hering was adopted, and the construction of a system of works at once commenced, involving before its completion, it is estimated, an expenditure of something over \$4,000,000.

The construction of the sewerage system for Indianapolis, which, I may say, is well advanced toward completion, is and has been based upon some fundamental principles, of which the following are a few :

1. A system which will answer the demands of a large modern city, anticipating a population of 240,000 persons.

2. The construction of a system designed to carry the foul waters to a proper outfall, and in such a manner that there remain no deposits of filth or facilities for its putrefaction within the populated parts of the city.

3. All ground-water to be kept out of sewers by making them water-tight, because such water can well enter the nearest natural water-course.

4. A proper formation of sewer junctions to prevent eddies, deposits, and eventually the destruction of the junction.

5. Junctions or taps for house-connections to be built into the sewer when originally constructed opposite every house or lot, so as to avoid breaking into the sewer later.

6. The construction of sewers in alleys where practicable to avoid the tearing up of pavements.

7. To use judgment to give sewers and drains the proper size. If too small, sewers are liable to be obstructed and drains to be gorged; if too large, they facilitate the deposit of suspended matter, and add a useless expense in the construction. The least size for a public sewer is usually taken at eight inches where no street but only sewage and roof-water enters the same. The smallest size for a sewer receiving the surface-water from a paved street should be ten inches and from an unpaved street twelve inches in diameter.

8. An avoidance of careless construction. We have not accepted the erroneous notion of many that, because sewers are covered up and out of sight, the character of the work may just as well be second-class.

If the sewers are carelessly built, their advantages may be largely lost. All brick used must be hard-burned and of regular shape, to make a smooth interior surface and resist erosion by constant wear. That this

matter of smoothness for the interior surface, besides being a sanitary measure, is also one of economy, will be seen from the fact that a two-foot semi-circular channel built of rough rubble masonry discharges but one half as much water as a vitrified pipe of the same semi-circular section on the same slope, or as a semi-circular channel with a smooth surface made with a plaster of pure cement.

It is important, in my opinion, to provide for the inlets to all sewers to be amply large, and thus reduce to a minimum the difficulty so often noticeable of the inability of the surface-water to rapidly drain from the street into the sewer. The necessity of this was demonstrated to our people when on the night of the 3d inst. seven inches of rainfall fell in twelve hours. In portions of the city where the new system of works had been constructed with large inlets the water was well cared for, and few complaints of overflows; in other portions of the city where the old system of sewers prevailed, with small inlets and fewer of them, the complaints were numerous of overflows from the streets into the cellars of adjacent property.

It has been demonstrated to us, in some cases, that it is better to follow practical methods rather than to adopt and depend upon theoretical ideas entirely in the construction of a sewer system.

Indianapolis has sixty miles of sewers, completed at a cost of over a million and a half dollars, of which amount the sum of \$848,839.05 has been spent by the department in the past four years perfecting the new system—the greatest amount of such work having been done in 1894, when 17.77 miles of main and local sewers were built, at a cost of \$633,330.69. This included the construction of the largest and longest sewer yet built in the State of Indiana, known as the "State Ditch" sewer, costing the property-owners assessed the sum of \$200,000.

In conclusion, I will say that Indianapolis can well rank as one of the most beautiful inland cities in the United States, and her people are impressed with the opportunities presented to them in the past few years to keep abreast with other cities; and while these expenditures at first seemed *almost unbearable*, a large majority of the taxpayers, and in this I mean the small taxpayer as well as the large, are almost unanimous in wanting the sewer system perfected and the permanent improvement of the streets continued as rapidly as is consistent. You will not forget that Indianapolis has made this vast improvement during a time of the greatest general depression probably that this country has ever experienced, and even with this Indianapolis stands to-day well to the front, if not a leader, compared to its size, in stability and financial standing.

MR. HOLTON: Our city engineer is here, and if you would like any information in regard to any matter he will be glad to give it to you.

THE PRESIDENT: Gentlemen, any questions asked will undoubtedly be answered.

MR. ROBERTS, Saginaw, Mich.: I understand from the paper just read by the gentleman that the Mexican asphalt has been admitted in the specifications of Indianapolis.

MR. HOLTON: It has not.

MR. ROBERTS: Have you had any experience with the Utah asphalt?

MR. HOLTON: No, sir.

MR. ROBERTS: This is an asphalt that I believe has not been used for a paving material in any city outside of Salt Lake City, Utah, until this season, when it was offered in competition for sheet asphalt pavement in a number of cities, and Saginaw is one city where a bid was received on this material; also on Trinidad-Lake, Bermudez, and Mexican asphalts; and our board recommended that a contract be awarded to the bidder using the Utah asphalt, and on account of this award our proposed asphalt street goes another year without an asphalt pavement. After our experience with asphalt contractors and their bids, we are very anxious to learn the experience of other cities with the Utah and Mexican asphalt; and I understand that some of the Utah material has been laid in the cities of Minneapolis and St. Paul. If so, I should like very much to hear from the engineers of either of those cities as to their experience with this material.

THE PRESIDENT: The engineer of Minneapolis sits right before you, and we will be glad to hear from him.

MR. CAPPELEN: Gentlemen, we have a Utah asphalt pavement in Minneapolis, about twenty thousand yards, completed four weeks ago, and now I am pleased to say that it is, as far as I can judge, turning out first-class. This so-called limerock asphalt—that is to say, it is limerock impregnated with bitumen—that is found in the mountains of Utah is pulverized and mixed with so-called pure asphaltum gum, Pittsburg flux, and sand. There is very little petroleum oil in it. It is put down in one coat of three and a half inches in original thickness, and rolled down to two and a half when it is completed, and it gives all the indications of turning out a first-class pavement. Of course, I don't know what effect our severe winters may have on it, but as far as it appears at present it certainly is first-class; and, due to one feature about it, I believe it will probably stand our winter better than any other asphalt, as in endeavoring to cut it out we can only do so with axes and picks, and cut out only so much by the teaspoonful. You can not pick through the stuff at once, but you have to pick it

out by half-inch layers at a time; so that, as far as I can judge at present, that material is all right; but if we meet again next year, I will be able to give you more information on the subject. I believe Minneapolis is the first city that introduced that pavement east of the Rocky Mountains. In the early spring I visited Salt Lake City. Some had been there two years, and some four years, and I took samples of those pavements right from the streets, and these samples give every indication of very good material indeed. It resulted that in my specifications I let everybody in; we did n't care who they were. Before we only permitted the Trinidad Pitch-Lake asphalt. The Trinidad price was \$2.75 and a five-year guarantee, and in letting in the other companies, asking for a ten-year guarantee, there was a reduction in Trinidad prices from \$2.75 to \$2.15 per square yard. The Utah people bid \$2.49 a yard, and were awarded the contract, through no fault of mine as engineer, having the ten-year guarantee. I was for the lowest bidder, which in this case was the Warren-Scharf people; but, as in many communities, the committee in charge awarded this particular contract to the American Asphalt Company, and the Warren-Scharf people were left, although they were thirty-four cents lower per yard.

MR. KENNEDY, Nashville, Tenn.: May I ask the gentleman who just read a paper on asphalt if he or any other gentleman present knows any thing of what is called the Kentucky asphalt, which is found in some of the lower counties of Kentucky? There are large deposits there of sandstone, with a great percentage of bitumen in it. The parties who have it have been trying to place it upon the markets of the country, claiming that it would make very effective asphalt streets. There has been some shipped to our city, and we have thought of having it crushed and put upon macadam streets as a binder. We have not sufficient information yet to induce us to try that experiment, and I have thought it possible that you or some other gentleman present has examined it. If so, I would like to have the benefit of your experience.

MR. HOLTON: We have not experimented with Kentucky asphalt. I doubt, however, whether our board would care to experiment with something of that kind unless we could get some practical tests. I understand there are some methods of testing asphalts, and we have said to all those who have bought these new asphalts that unless they brought some character of a test we would not experiment with it.

MR. CLARK, Peoria, Ill.: I would like to ask the gentleman what are the specifications this year as regards the laying of concrete and the thickness of the asphalt?

MR. HOLTON: Our specifications this year called for six inches Portland cement concrete base, with a two and a half inch asphalt top.

MR. CLARK: What were your prices?

MR. HOLTON: We can hardly compare one street with another. As I said in my paper, there were hardly any permanent improvements in 1891; we had hardly two miles of improved roadways. Our grading varies very much, and therefore it is hardly safe to gauge a price where the grades are not already established; however, we are getting all our streets practically this year at \$2.25. We had some streets last year that we got for less than that, owing to some irregular competition that brought the price down, but that was simply temporary.

A DELEGATE: Let me ask you whether that \$2.25 included excavation?

MR. HOLTON: I call attention to the excavation, because that is the nearest average that I can give you. The price includes very light excavation, say eight and a half inches, as it would be if the grade had already been established.

MR. CLARK: How do you determine whether you get Pitch-Lake or land asphalt?

MR. HOLTON: The companies furnishing asphalt will, if you please, supply bills of lading, certificates of port wardens, affidavits, etc. We have contractors there now that have furnished them.

MR. CLARK: And you do not know positively whether you receive land asphalt or lake asphalt?

MR. HOLTON: We do not feel quite positive; but our bond is very severe, and we make them make an affidavit in advance, and put all the safeguards around us that we can.

THE PRESIDENT: I understand that the city clerk of Toronto is here, and can offer some observations on this matter.

MR. BLEVINS, Toronto, Can.: Mr. President and gentlemen of the convention, I thank you exceedingly for the honor that you have done alike to me and the city of Toronto to-day in calling upon me to address you for a few moments on this very important and interesting occasion. I regret to say that I have not been able to make any

preparation with regard to the matters which are now pending before you and being considered by you, and which I believe will engage your earnest consideration and attention during the time of this convention. Not being familiar with the matters which are now being discussed before you, and which I have listened to with very great concern and interest, it will not be, of course, surprising that I will not take any part in the discussion of those matters. I may be permitted to say, however, that I feel that I am, at all events, conversant — yes, familiar — with the law relating to the municipal institutions of our own country, and therefore, gentlemen, I will only speak with regard to our municipal system — I mean the municipal system which has prevailed in the province of Ontario for at least forty years. We have no charter to enable us to manage our municipal affairs in Toronto, but we have that which is equivalent to — indeed, perhaps better than — a charter. It is that which is embodied in an act of Parliament, which was passed, as I have said, over forty years ago, and which has been from that time down to the present time amended and altered as the circumstances of each municipality required and sought for at the hands of the legislature. This act I may say is one of those which is considered to be a well-conceived and devised act; it is one which has received the best and earnest attention of our ablest statesmen and of our most prominent citizens; and I therefore claim that in the province of Ontario is to be found one of the most complete systems relating to municipal governments in the world. I regret to say that I had not an opportunity before leaving Toronto of looking into that statute a little more carefully; but I may say that while it is the foundation of our system, and every act that is required to be done under that municipal system is provided for by that statute, that statute is applicable not only to cities, but it applies to every municipality throughout the province of Ontario, whether it be a village, a township, or a county, and so it may now be regarded as a provincial, nay, national charter. Since I arrived at the meeting in this room this morning I have heard much discussion amongst the gentlemen present with regard to sewerage systems, and as to that I can only say that we have in Toronto an excellent system provided for the management of our sewers and drainage. This is particularly provided for by the act of parliament to which I have referred; and not only does the act provide for it, but it has given authority to the Municipal Council of the city to pass by-laws in relation to it; and, acting upon that author-

ity, the city of Toronto in 1891 passed a by-law which has been well and carefully considered, alike by the Council and by its officers, and which is still in existence, and under its provisions and of the act authorizing it we have been enabled to inaugurate and carry out a system of sewerage which has received much approbation. We have also an act of Parliament which enables us to inaugurate and carry out that system of sewerage, even although it be not approved by the people in general; that act enables the city engineer and the medical health officer to report upon the necessity which may exist for the construction of a sewer, or for the carrying out of a system of sewerage, and upon their reporting in favor of the work the Council always acts and authorizes the work which has been so recommended. I very much regret to say, gentlemen, that one of the deputation who was authorized by our Council to attend this convention has not yet arrived, but I expect that he will be here before the close of the day. This gentleman, I understood, had prepared a written statement in relation to parks and their effect so far as sanitary relations are concerned, and I have no doubt whatever if he were present that he would read the address which I believe was ably and elaborately prepared before we left Toronto. The gentleman to whom I have referred is Mr. Alderman Hallam, the chairman of the Parks and Gardens Committee, a gentleman who has given a great deal of attention to subjects relating to parks and public squares, and their effects upon people generally, and in relation to matters of a sanitary character. But we have present here to-day a gentleman who accompanies the deputation from Toronto, who has devoted his whole time and earnest attention to the cleaning of streets, the removal of garbage, and matters of that character. I mean Mr. Jones, our efficient and zealous street commissioner, who has prepared a paper on those subjects, and with the permission of the convention I believe he is prepared to read it. Mr. Alderman Burns and Mr. Alderman Graham, the members of the deputation from Toronto, are also present at this convention in response to the kind invitation which we received from your Secretary and President. In conclusion, gentlemen, I thank you for the honor you have conferred upon me and the city of Toronto, and I shall carry back with me very pleasant reminiscences of this visit to your city, and when I return to Toronto I shall tell the people there of the courtesy and kindness the deputation had received at your hands. [Applause.]

THE PRESIDENT: I hope that the gentlemen from Toronto will be present with us at to-morrow's session, as several papers will be read which will treat upon the question of cleaning streets and upon sanitary measures, and when these papers are read we would like to have the experience of our friend from Toronto, and I hope he will be with us at that time. The hour has arrived for us to adjourn, so as to enable us to take dinner and be ready to report to the Committee of Arrangements at half-past one. Unless objection is made, I therefore adjourn this meeting until 7 o'clock sharp this evening, in this room.

Thursday, September 12th—Afternoon.

At 1:30 o'clock in the afternoon the delegates and visitors assembled at the Gibson House, and were placed in special cars furnished by the Cincinnati Street Railway Company. They were then taken over the entire system of street railways. A lunch was given at Bob Grear's resort, in Chester Park, and the entire party were entertained later at the Moerlein brewery, one of the largest breweries in the world.

Thursday, September 12th—Evening.

Promptly at 7:30 o'clock the delegates again assembled in College Hall for the evening session.

THE PRESIDENT: The first order of business will be the report of the Committee on Nominations.

MR. STATES: Mr. President, I would ask that the convention take a recess for five or ten minutes longer, so that we may have a larger representation here.

THE PRESIDENT: It is half-past seven now.

MR. STATES: There are quite a number of people in the dining-room at the Gibson House who probably will be here in a few minutes.

THE PRESIDENT: It is half-past seven o'clock now and at eight o'clock we are due at some other place. It is moved that we take a recess of five minutes.

MR. MUNRO: Mr. President, before that motion is made it seems

to me we have a little business to transact that will probably be advantageous to the society, and that is that I would be in favor of appointing a committee to divide up the different subject-matters for the next convention; so that when we come there we will know just what we are to do, and set up what we shall do each day, so that members can come prepared beforehand, so that the convention will know the duties it has to perform and will do it intelligently. I think that a committee should be appointed to divide up these different subject-matters to be discussed at the next annual convention.

MR. HERRMANN: Mr. Chairman, has not that been provided for by the amendment?

THE PRESIDENT: It provides for certain subjects which are mentioned in the article, but I do not know as to the appointing of the committee.

MR. HERRMANN: Is that section here? There seems to be a misunderstanding as to that.

DR. PRENDERGAST, Cincinnati, O.: Mr. Chairman, permit me to offer as an amendment to the motion now pending, that Mr. Butterfield, of Cincinnati, be appointed sergeant-at-arms, and that he be instructed to bring in the delinquent members. I see no necessity for a recess.

THE PRESIDENT: It is moved that Mr. Butterfield act as sergeant-at-arms and bring over the delinquent members. [Motion carried.]

MR. BUTTERFIELD: It is understood that I can call on Chief Deitsch to assist me, if necessary? [Laughter.]

THE PRESIDENT: That is the sense of this convention; you go with full authority of the convention. Now this motion of Mr. Munro will be in order, that a committee be appointed to divide the subjects among the proper committees, and to arrange a programme of the business for the next convention. I understand that is the subject of the motion.

MR. MUNRO: Yes, sir; I make that motion.

THE PRESIDENT: Are you ready for the question?

MR. JOHNSON: Mr. Chairman, it seems to me that this is usurping the prerogatives of the Executive Committee. If you want a committee of that kind appointed, what is there left for the Executive Committee. It seems to me that the very thing that you are trying to arrive at is one of the duties of the Executive Committee.

MR. MUNRO: I would like to have the article read.

THE SECRETARY (reading): "Section 4, Article IV—There shall be appointed only the following standing committees: 1. On street-paving; 2. On electric street-lighting; 3. On sewerage and sanitation; 4. On waterworks and water-supply; 5. On taxation and assessments; 6. On city government and legislation. The members of each committee shall be three, and the chairman may add such names as he may deem advisable."

MR. MUNRO: I withdraw the motion, Mr. President; that covers the ground.

THE PRESIDENT: That leaves the appointing power uncertain; it does not say whether by the Executive Committee or whether by the convention. It would be rather difficult for the Executive Committee at this time, I should judge, to appoint those committees, because to make the work operative the chairman should be selected from the membership for his qualifications to take hold of the subject specially assigned to his committee, and it may be impossible for the Executive Committee at this time to determine, unless they were very well acquainted with the membership, as to who is best qualified to take charge of that work.

MR. HERRMANN: Let us have that section read again.

Section read by the Secretary.

MR. WADDLE, Chillicothe, O.: I move you that the chairmen of these committees be selected by ballot, and that the chairmen after election select a committee to be reported to this convention to-morrow morning for the ratification of the convention.

THE PRESIDENT: It is moved that the chairmen of these committees be selected by ballot, and that he complete the membership, and that the chairman report the names to the convention to-morrow morning.

MR. DEVILBISS: I move as an amendment that the President of this convention appoint the chairmen of these committees.

THE PRESIDENT: You have heard the amendment as offered. Are you ready for the question?

The amendment being put, it was carried.

THE PRESIDENT: The motion now is as amended. All those in favor of the motion as amended will please manifest it by saying aye; opposed, no. [Motion carried.] The next business in order is the report of the Committee on Nominations of officers.

Mr. Wright, Cleveland, O., chairman of the committee, reported as follows: For President, Mr. G. H. Benzenberg, of Milwaukee, Wis.; for First Vice-president, Mr. William R. Kerr, of Chicago, Ill.; for Second Vice-president, Mr. August Herrmann, of Cincinnati, O.; for Third Vice-president, Mr. James E. McGann, of New Haven, Conn.; for Secretary, David L. Fulton, of Allegheny City, Pa.; for Treasurer, Mr. John L. Kennedy, of Nashville, Tenn.

MR. WRIGHT: Three cities—namely, Chicago, Nashville, and Indianapolis—have invited the society to hold the next annual convention in their respective cities, which cities we recommend for the place to hold the meeting.

THE PRESIDENT: You have heard the nominations. Other nominations are now in order.

MR. DEVILBISS: Mr. President, I would like to make a motion that Mr. Herrmann's name be placed as First Vice-president.

DR. PRENDERGAST: If there is a member of this society who, more than another, is entitled to the first vice-presidency of the organization, that man is Mr. August Herrmann, of Cincinnati. Were it not for his determined opposition and pronounced objection, we would be on this floor to-night giving you reasons why, in our opinion, he should be selected as the President of the society. If fidelity to duty, if earnestness of purpose, if ceaseless toil in behalf of the cause are entitled to consideration, then Mr. Herrmann is the logical selection for First Vice-president, and why your Committee on Nominations has relegated him to the position of Second Vice-president is more than I can understand. I am in perfect harmony and in complete unison with Chicago; I desire that Mr. Kerr be selected as Second Vice-president; but in behalf of the Cincinnati delegates I move as an amendment to the report of the committee that Mr. Herrmann be substituted for that of Mr. Kerr for the position of First Vice-president, and that of Mr. Kerr be substituted for that of Mr. Herrmann for the position of Second Vice-president, and I hope to receive a second to the amendment.

MR. KERR: Mr. Chairman, I sympathize very fully with the gentleman who has just taken his seat in his statements concerning the labors accomplished by Mr. Herrmann, and I desire to second the amendment offered by the gentleman. [Great applause.]

DR. PRENDERGAST: Mr. Kerr, on behalf of Cincinnati, permit me to thank you sincerely.

THE PRESIDENT: We will now proceed upon the ballot, upon the nominations as stated, and I will appoint as tellers Mr. Johnston of Saginaw—

MR. KERR: I move that the Secretary of this organization be instructed to cast one ballot for these officers.

DR. PRENDERGAST: I second the motion, that the rules be suspended and that the Secretary be instructed to cast the white ballot for the nominees as now selected—Mr. Herrmann as First Vice-president, and Mr. Kerr, of Chicago, as Second Vice-president.

THE PRESIDENT: Gentlemen, you have heard the motion, that the rules be suspended and that the Secretary be directed to cast the ballot of this society for the officers mentioned and named by the nominating committee, with Mr. August Herrmann, of Cincinnati, as First Vice-president, and Mr. William R. Kerr, of Chicago, as Second Vice-president; otherwise as reported by the nominating committee. Are you ready for the question?

Cries of "Question, question." Motion carried unanimously, and the Secretary cast the ballot as directed.

THE PRESIDENT: The Secretary has cast, according to your wishes, the ballot of the society, as follows: Your humble servant as President; Mr. August Herrmann, of Cincinnati, as First Vice-president; Mr. William R. Kerr, of Chicago, as Second Vice-president; Mr. James E. McGann, of New Haven, as Third Vice-president; Mr. David L. Fulton, of Allegheny City, as Secretary; and Mr. John L. Kennedy, of Nashville, as Treasurer; and I declare them so elected according to your wishes.

Long and continued applause.

THE PRESIDENT: Gentlemen, I suppose that you have discovered by this time that the party you have selected as your President is not a speaker, nor gifted with any eloquence. If ever I wished for that gift it is at this moment, so that I might word to you my hearty and sincere thanks for this approbation and preferment on your part to serve you as President of what I consider will become one of the most influential societies among all the national organizations that has ever been started in this country. [Applause.] The influences of this society will, if it proceeds along the line laid down at this meeting, be felt throughout this country in every municipality in the conducting of the business and in the construction of works on a better basis, without error, without mismanagement, and with the experience taught not

only in this land but of foreign countries, as I have not any doubt that we shall gather into our membership such parties as are thoroughly acquainted with the practices of Europe as well as in this country. Gentlemen, I thank you for the high compliment and honor you have conferred upon me this evening. [Applause.]

Cries of "Herrmann! Herrmann!"

MR. HERRMANN: Mr. Chairman and gentlemen of the convention, we have had two very hot days, and I know you feel like I do, and would be glad to get out of here. I certainly appreciate this honor very much, and sincerely thank you. [Applause.]

DR. PRENDERGAST: I desire to call upon my friend Mr. Kerr, of Chicago, who is a health officer, for a remark or two.

MR. KERR: Mr. Chairman and gentlemen of the society, although Chicago has a worldwide reputation as being the pre-eminent windy city of the continent [laughter and applause], I hardly think that any of you here to-night will expect me to detain you at this time with any thing that I might be able to say. I will say this, however, Mr. Chairman, that since coming to Cincinnati to this meeting, not being fully advised before the meeting commenced as to the scope or the intention of this society, that I have felt considerable interest in the same from the time I arrived. I believe this society's influence can and should be extended not to a membership of two hundred and fifty, but to a membership at our next meeting of from five hundred to one thousand. I undertake to say, Mr. President, and I have no doubt, the chief officers taken into this society will carry the work through successfully; and if the work of an organization of this kind is undertaken energetically, as I have no doubt it will, with such a President behind it, I hope that when the roll is called at the next annual meeting of this society it will show at least from five hundred to eight hundred people present.

THE PRESIDENT: I assure you that I will do all I can in this direction for the society, because I am heartily interested in the spirit of this society. Undoubtedly the gentlemen would like to hear from the Third Vice-president.

Cries of "McGann! McGann!"

MR. MCGANN, New Haven, Conn.: Mr. Chairman and brother delegates [applause], I simply wish to thank you from the bottom of my heart for your kindness in selecting me as your Third Vice-president. [Applause.]

DR. PRENDERGAST: Mr. President, I would like to hear from the gentleman who has devoted so much of his time to this organization. Who would accept the secretaryship of this organization but Mr. Fulton, of Allegheny? With your permission I will call upon Mr. Fulton.

MR. FULTON: Gentlemen, I do not know whether this is a compliment or not, to say that "who in all this great body would accept the secretaryship except Mr. Fulton from Allegheny." [Applause.]

DR. PRENDERGAST: You had no opposition.

MR. FULTON: No opposition! I will simply say this, that last year when we met at Buffalo the gathering was very small in comparison to this. Those of you who were there will recollect under what conditions we gathered. I went there knowing nothing whatever of what was to be done, and had no comprehension at all of what we were expected to do, of what we intended to do. I went there thoroughly unprepared, and after I found out what the arrangements were, that this society was to be made one to gain more information for the carrying on of municipal work, I heartily enlisted in the work. I think we had thirteen cities represented, and each one had one member on the committee, and I suppose that as I was the youngest one I was selected to take the notes. I do not know why else, and the result is that I have been re-elected. Of course, you will all realize that there is considerable work connected with this institution, and from the manner in which it has increased from last year to this year I feel like helping it along—as the boys say, "pushing it along." [Applause.] And I will do all in my power to have twice as large a gathering next year as we have here this year.

THE PRESIDENT: Undoubtedly the convention would like to hear from Mr. Kennedy, who has been selected as the Treasurer.

MR. KENNEDY: Mr. President and gentlemen of the convention, I beg to tender to you an expression of my gratification and thanks for the courtesy you have extended to me in selecting me for your Treasurer. I am not vain enough to think that the courtesy is to me alone, but I accept it as a courtesy to Nashville, the principal city of the South. I accept it, and assure you, gentlemen, that it shall be my earnest effort to justify the confidence you have reposed in me. Nashville is much interested in the welfare of this associa-

tion, and perhaps more so than any other city. We have a form of government there looking to the improvement of municipal government, and I hope that in the future we will have an opportunity of seeing you there, and conferring with you and showing you what we are doing, and what we will do, and that we are doing all in our power to make the work of this association a success, so that it may yield great good to the people of our common country.

THE PRESIDENT: Gentlemen, according to the constitution, the next business in order is the selection of the location for the next convention. The Nominating Committee has informed you that the cities of Chicago, Nashville, and Indianapolis have invited you to hold the next annual meeting in their respective cities.

Here the Hon. Dorsey Patton, of Chicago, Ill., made the following plea for his city:

MR. PRESIDENT AND GENTLEMEN OF THE CONVENTION:

As a humble representative of the convention from the great city of Chicago, I desire to say to you that in the event you deem it expedient to grant the city of Chicago the next meeting of this association, I will promise you, and I know I do it with safety, that we will see to it as a municipality—as Chicago—as the wonder of the world, to make your stay both pleasant and profitable. [Applause.] I never was so much taken back as when I came to the city of Cincinnati with my delegation—and it was my pleasure for the first time in my life—to this metropolis of the great State of Ohio that sparkles in the national history of our country. [Applause.] When we came here, Mr. President, we presumed and we thought, from bywords and articles in our papers, that we would see a staid, old-fashioned German municipality. I want to say to this convention, Mr. Chairman, that the hospitality that this convention has received at the hands of the gentlemen in the elective offices, from Mayor Caldwell down, has excelled even the hospitality of Chicago when she threw her gates open to the world. I never saw such a reception in my life. [Long cheers and applause.]

On every occasion, from the time when we first viewed this grand city of smoke, with her soft coal [laughter], the chief executive officer of the city was there and graced the occasion with his presence. Every official left his department and accompanied us through the city; it is commendable to the highest degree, and I want to apologize for what we expected.

Chicago had the nerve, gentlemen, before the gates were opened, to subscribe to "The World's Columbian Exposition" twenty-two million dollars. [Applause.] When we had done that we had carried out the obligations we had made. I want to say just this for the grace of our city and for your information, that when a gentleman comes here in this

convention and speaks of Chicago, that Chicago has got beyond the powers of any individual. The Chicago that I represent is made up mostly—her prominent, commercial, social, and political men hail from this glorious State of Ohio. [Great applause.] You know in the city of Chicago to-day (and our President will vouch for and substantiate what I say) the most brainy men of our municipality hail from this city, the Queen City of the West, which you have honored with the convention. Milwaukee is represented in Chicago, so is Cincinnati, Dayton, Boston, and New York. The man who lives two years in Chicago is a full-fledged and an old-time citizen. [Applause.]

Gentlemen of the convention, when a man comes within your midst at any convention, be it on municipal or political questions, when he says, "I represent or speak to you for that city," permit me to say, Mr. President and gentlemen—and I have lived in Chicago since 1867, twenty-eight years ago yesterday—that I have been able in my political life to go over the north side of Chicago but once in twelve years, and then I had to apply to a street-car driver or a policeman and say, "For God's sake, tell me my geography; tell me where I am; I do not know where I am at." [Laughter.]

It is true, gentlemen, that when Chicago presents herself as a candidate for any convention you may say, "You Chicago people assume a great deal, and ask for every thing in sight." Permit me to state, with all due respect to this association of municipal improvements, that as our Commissioner of Health, Mr. Kerr, said, "In the event of your coming to Chicago we would not know you were there; unless some personal postal cards have been distributed in the city, we would not know you were in our midst." We had to protest, not later than two years ago, when the National Committee of the Republican party assembled in New York, and say to them, "We do n't want the National Convention in the city of Chicago." Mr. William J. Campbell, who was appointed chairman of that committee, said, in the name of Chicago, "We do not seek, we do not desire at this time to have the Republican National Convention within our gates." Gentlemen, we had at that time the Columbian Exposition. When a city is of such magnitude that it will ignore a Republican National Convention, and when they say to the people, "You take your National Encampment down south of the Mason and Dixon line, you take it down to Louisville, Ky.," we grant you that then that city is truly great.

Gentlemen, I have talked with my colleagues who came here and we have said we would ask for this convention. I want to tell you why we ask you to hold your next meeting in the Garden City of the West. We ask for this in justice. We want to show you in Cincinnati that we have been humiliated, that we have been put back by the hospitality of this grand city, of this great State of Ohio, where the people of the United States look for their national party leader, and we want you to say-after

you come within our gates, in the event Chicago is chosen for the next convention, we want you to say from the bottom of your souls, "Oh, they treated us magnificently in Cincinnati; we thought that that treatment could not be outdone; but, O Chicago! Just think what we have seen in one day." [Applause and laughter.]

Gentlemen, I speak for Commissioner Kerr; for our city engineer, Mr. Jackson; for Mr. G. L. Clawson, who is superintendent of our sewers,—we have been perfectly satisfied; we have been arguing vitrified brick versus asphaltum and macadam; we have accepted your sandwiches; we have drank your lager; we have seen your grand city; we have been entertained by all, from your mayor to the smallest officer; and, gentlemen of the convention, if this is a typical representation of hospitality in the greatest city of Ohio, if this means that this is to set the pace for the grand nation of which we are citizens, I say to you with all sincerity, "Godspeed Cincinnati and her citizens." [Applause.]

Now, Mr. Chairman and gentlemen, if you will permit the gentlemen who represent Chicago to invite you to name that place as your next meeting-place, I will say to you—well, it will take me about four hours to enumerate what we will do for you. But, Mr. President and gentlemen, I will tell you part of what Chicago will do if you come there. You will get the benefit of the great drainage canal, the greatest engineering scheme that has ever been projected in the world, where ninety million dollars will be spent before it is complete. We will take the gentlemen who are superintendents of public works of their respective cities to that canal and paralyze you, and make you stand there and wonder that the world is moving. [Applause and laughter.]

Gentlemen, in the event of your coming within our gates, we will take you to the Government Pier, running five miles in Lake Michigan. We will take you to nine distinct and separate tunnels. We will show you the working of the mighty systems of the city of Chicago. After that is done we will start with you and take you to old Fort Dearborn, and show you the Fort Dearborn of forty years ago. We will take you to the park, and we will show you forty miles of boulevards that you can ride on all day without batting an eye. We will show you the statue of the great emancipator, Abraham Lincoln. [Applause.] We will show you in the same park the hero of Fort Donelson, our silent statesman of Illinois. We will show you the Sheridan Drive. We will then take you from the Sheridan Drive, and we will bring you down and show you the grandest waterworks system you ever saw. In fact, gentlemen, you shall have the benefit of every thing Chicago has to-day. You are not only to be edified and entertained, but you will be instructed. The gentleman who opened this meeting, Mr. Herrmann, laid great stress upon his statement when he said that you would stop at the breweries; so will we, but we lay greater stress upon our Michigan Grand Boulevard, on which you can walk for seven miles before you take a turn. We will show you all that,

gentlemen. When you come through the Grand Boulevard, we will take you on to show you the Avenue Boulevard. We will show you Garfield Park. We will show you the world's greatest office-building, and teach you the architecture of tunnels. After we get through with the sandwiches, we will give you a banquet at the Auditorium, which seats eight thousand people, and you can come in your business suits or your full-dress suits, and you will have the co-operation of the present administration of Chicago, because it will last out through these two years, I know. [Laughter.] After we have gone through the boulevards; after we have traversed the grand residence district and seen the grand tower building, twenty-two stories high; after we have seen all these things, gentlemen, you will see the theaters in full blast.

After this we will show you the commercial interests of the city; we will show you the greatest railroad center of the world; we will show you the greatest shipping-point of the world; we will show you the greatest stock-yards of the world; we will show you the finest banks of the world; we will show you the finest boulevard system of the world; and in the event of your coming you will prosper and you will be instructed. In the name of Chicago I ask for this convention to meet there. I would like to have you say to-night, "We are for Chicago unanimously."

Gentlemen, I hope with these few remarks you will grant us the great distinction of entertaining the next annual convention. [Cheers and applause.]

THE PRESIDENT: If there are no further remarks, we will now proceed to the selection of the next place for the convention.

MR. WILLIAM FORTUNE, Indianapolis, Ind.: Indianapolis has been reported by the committee as one of the cities extending an invitation to the society as a meeting-place for next year, and it is due the city that I should tell you how its name comes before you. In Indianapolis we have an organization known as the Commercial Club, which I have the honor to represent here as an officer, with the special mission of extending to you an invitation to meet in Indianapolis in 1896, if it is your pleasure to do so. The Commercial Club is an organization composed of a thousand of our leading business and professional men. The organization came into existence about five years ago for the purpose of bringing about such improvements in the city as was reported to you in the paper read before your society to-day by Mr. Holton, the chairman of our Board of Public Works. Four years ago we had scarcely any permanent street-paving at all; to-day we have about forty miles of permanently-improved streets, and the work is only fairly begun. It was under the auspices of the Commercial Club that the Paving Exposition was held in 1890. This was the first and most

successful exposition of this kind ever held. It brought to Indianapolis over five hundred official representatives of the cities of the United States, who came for the purpose of availing themselves of the opportunity thus afforded for obtaining information regarding street-paving materials and methods. There is unusual interest among our people in the purpose for which your society is formed. Indianapolis is a city of 150,000 inhabitants, yet it is not so large that we will not know of your presence when you come there; you will *not* be lost there. [Applause.] I assure you that if you come to Indianapolis, every thing that can be done to make your visit there a pleasant and profitable one will be done. The Commercial Club has an ample fund for providing for meetings, and gives its financial backing to the invitation extended to you on behalf of Indianapolis. I feel that it would be presumption to say that Indianapolis or any other city would or could excel the hospitality of Cincinnati, which has surpassed the anticipations of all of us. It has been both generous and gracious in the highest degree, and I feel that it can not be fitly characterized by any words; but again I assure you that if it is your pleasure to come to Indianapolis, we will do every thing that we possibly can to make your visit there pleasant and profitable. [Applause.]

A DELEGATE FROM INDIANA: Being a native-born Hoosier, I have some local pride in the invitation to this convention to come to our state. I want to indorse every thing that my friend has said in regard to Indianapolis. Our city is some three hours' ride from Indianapolis; near enough for me to know it well. I am not authorized to make any statements, but I will guarantee every thing that he says. It is a beautiful city, surrounded by a great agricultural country, and, by the way, it is the home of General Benjamin Harrison. [Applause.]

Mr. Lindsley, of Nashville, Tenn., then made the following plea for his city:

In behalf of the Chamber of Commerce of our exceedingly modest little city of about eighty thousand inhabitants, and in behalf of the people themselves of Nashville, I repeat and heartily urge your acceptance of the invitation that has been extended to you by my friend, Mr. Kennedy, to hold your next annual convention in our city. I am not a practiced speaker, and I can not blow Nashville's horn as loudly and as gloriously as the gentleman has just blown Chicago's, but I have a few words to speak that may prove of interest to some of you, descriptive of our city and the blue-grass region surrounding it.

There are several reasons why Nashville may be interesting to the people of our country at large next year. It is, in the first place, the convention city of 1896. The State of Tennessee celebrates there next year the hundredth anniversary of her membership in our great sisterhood of states. The exposition commemorative of this great event will be state and interstate, national and international, and will be the largest ever held in the United States, with the exception of 1876 at Philadelphia and the great World's Fair at Chicago. During that year our people will be ready to receive and welcome all who come within her limits.

We have ample hotel accommodations and splendid hall facilities, and Nashville, as every one knows, is situated in the heart of a blue-grass region that is not even second to the district around Lexington.

Side excursions can be arranged for embracing many points of general interest. Franklin, Murfreesboro, Shiloh, Fort Donelson, Chickamauga, and other noted battlefields of the great civil war are within easy distance, while Lookout Mountain, Mammoth Cave, and several famous Tennessee points of interest can be reached by a few hours' ride.

To those who care most for forest and field, the great blue-grass stock-farms of Middle Tennessee will offer superior attractions. At Belle Meade, six miles away, can be seen the best thoroughbred horses in America. Iroquois, who has the peculiar distinction of being the only American horse that ever won the English Derby, and since the formation of the English turf one of the only two that won the three classic events—the Derby, the St. Leger, and the Prince of Wales stakes. There too can be seen the produce of the great stallion Bonnie Scotland, who first gave truth to the assertion that Tennessee bred the best horses in America. Great Tom, Inspector B., Enquirer, Luke Blackburn, Longstreet, Tremont, imported Loyalist, and Clarendon, the last-named the son of the \$100,000 St. Blaise, comprise the remainder of the stud. A herd of four hundred deer in a park of many hundred acres is a sight rarely to be seen. The pastoral beauty of Belle Meade scarcely has its equal in America, and its genial owner, General W. H. Jackson, entertains with old-time hospitality.

How would a grand barbecue in the midst of a six-thousand-acre blue-grass farm strike some of you? If you will come among us, we promise you not only hospitable and friendly hosts, but that you shall meet pleasant, beautiful, and charming ladies, who will welcome you with all the old-time Southern grace. [Applause.]

MR. F. L. RICHLEY, St. Louis, Mo.: Unless some other city has some claim for our next annual meeting, I will move that Chicago be the place.

DR. PRENDERGAST: We desire to thank the representative from Nashville; but with your permission I would like to direct your special

attention to the silver-tongue Demosthenes from Chicago. [Applause.] Cincinnati has many beautiful attractions, of which she is justly proud, but never until to-night have I fully appreciated how sadly we stand in need of a Dorsey Patton. This same Dorsey Patton, so far as the world is aware, devotes his great intellect to his official duties as city sealer of Chicago; but I have it on the authority of his friends, Jackson and Kerr, that the salary and perquisites he receives from that position are the smallest part of his income. What I tell you now, of course, is confidential: Dorsey Patton is one of the high-salaried orators of Chicago, employed for the purpose of attending all such gatherings as this, singing the praises of his city, and finally stampeding conventions in favor of any thing and every thing Chicago asks for. [Applause.] Certainly no man could sing the songs of Chicago more sweetly than does this same Dorsey, and I am confident you will agree with me that to-night, at least, he has earned his salary.

THE PRESIDENT: Gentlemen, permit me to remind you that we are invited to attend an electric display, and we owe it to them to be present, and I would therefore recommend that we get through with our business as soon as possible.

MR. CLARK: Peoria, the second city of the State of Illinois, takes pleasure in seconding the nomination made by the gentleman of St. Louis, that this next convention be held in the city of Chicago.

THE PRESIDENT: Gentlemen, you have heard the motion that the next convention be held in the city of Chicago; are you ready for the question? [Cries of question.] All in favor will manifest it by saying aye; opposed, no.

Motion carried unanimously.

On motion of Mr. DeVilbiss, the society then adjourned until 9 o'clock on Friday morning.

Friday, September 13th—Morning.

The delegates assembled at 9:30 o'clock in College Hall for the morning session.

THE PRESIDENT: I supposed when the hour of adjournment was changed from 10 to 9 o'clock last evening, that it meant that the members of the society would be here to attend to business at that time. At 9 o'clock there were but three members present. We

have now a quorum present, and will proceed to attend to business. I have this morning received the following communications, which the Secretary will read.

The Secretary here read the following communications :

CINCINNATI, September 12, 1895.

PRESIDENT AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS,

Gibson House, City :

DEAR SIR,—We extend an invitation to the members of your society to visit our works at Smith and Augusta streets, and examine our process of softening hard waters for manufacturing purposes and the general city supply. The same process is applicable to the purification of river-waters.

We have a plant in actual operation, and would be pleased to explain the method of working it, and the advantages which attend its use.

Yours respectfully,

THE WE-FU-GO CO.,

Per N. O. GOLDSMITH, V. P.

On motion of Mr. Hess, the invitation of Mr. Goldsmith was accepted.

The Secretary also read the following :

CINCINNATI, September 12, 1895.

HON. AUG. HERRMANN, Chairman, etc., Cincinnati :

DEAR SIR,—I desire to extend to the distinguished visitors who have come to our city to discuss municipal matters the courtesies of the Chamber of Commerce, and therefore will be glad to avail myself of the opportunity of having such invitation extended through your good self to these people.

Very truly yours,

JAMES M. GLENN, President.

On motion of Mr. Kennedy, the invitation was accepted.

The Secretary also read the following communication :

CINCINNATI, September 12, 1895.

MR. BUTTERFIELD :

DEAR SIR,—If you will kindly inform Mr. D. E. Wright, of Cleveland, and the other gentlemen who as delegates were entitled to free long-distance telephone service, that if they will call at 314 Vine Street (new number) the amounts they were charged for messages to Cleveland and Indianapolis will be refunded to them. We regret very much that this mistake should occur, and trust that you will assist us in rectifying it as far as possible.

Very truly yours,

GOUVERNEUR CALHOUN, Manager,
Per E. B. PRICE.

Thereupon the President introduced Mr. Thos. D. De Vilbiss, of Fort Wayne, Ind., who read the following paper:

COLLECTION AND DISPOSAL OF GARBAGE.

BY THOS. D. DE VILBISS, DIRECTOR OF THE BOARD OF PUBLIC WORKS,
FORT WAYNE, IND.

MR. PRESIDENT AND GENTLEMEN OF THE CONVENTION:

In the preparation of a paper upon the subject of the proper disposal of garbage, I have assumed that my hearers are experienced, and readily comprehend the necessities which now environ cities and municipalities as to the proper method of disposing of garbage.

In order that my time may be employed to the best advantage, I have eschewed all argument as to necessities, and will endeavor to present a practical view upon this important subject.

The disposal of garbage embraces a consideration, first, of the method of collection; second, the character of vehicles; and third, the system by which it shall be destroyed.

The method of collecting garbage should be placed under direction of a competent department of the city administration, which should be empowered to provide ways and means and adopt such rules and regulations as will compel the use of properly-constructed water-tight metallic receptacles upon the part of the citizens, which should be located at points conveniently accessible to the collector; and in cities where coal is used as a fuel, ashes and all other refuse materials not incident to kitchen offals should be kept separate from the garbage.

It is evident where citizens are permitted to place their garbage in vessels of their own selection, and permitted to choose places for the purpose of disposing of the same, that a very unsatisfactory condition will result. Many may perform satisfactorily, while others will not, and a conflict will arise between the citizens and officers appointed to execute the law.

It is therefore clear to my mind that the collection of garbage should be under the direction of a proper department, with full power to regulate the same.

I am aware that a system which would be perfectly satisfactory in a city of the population and geographically located as the city I represent might not meet the requirements of other cities, and the methods by which garbage can be collected is largely a local question.

It has been my observation that where cities permit the work of collecting the garbage to be done by individual contract an avaricious and unscrupulous contractor will scheme to defeat the purpose of the contract, to enrich himself at the expense of sanitary conditions, which necessarily surround the disposal of garbage, and where the citizens

have been permitted to employ local cartage exorbitant prices have been demanded, and the poorer classes compelled to live for days and weeks with the decaying matter surrounding them, unable to have the same removed.

It is therefore apparent that citizens in their individual capacity can not be relied upon to provide ways and means for the proper disposal of garbage, and at once places the matter within the direction of the city administration, and brings us to the question as to how a city official can best direct the collection of garbage.

Assuming that garbage should be lifted once in forty-eight hours, or every other day, and that the vehicle has a capacity of two cubic yards per load, and the distance to haul is not greater than one mile, and the population equal to about eight thousand people, it has been demonstrated that a district such as I have described can be kept clean and in a good, healthful condition; and has led me to believe that cities should be divided into districts, the area and population of which should not be greater than one man with a team can get over in two ordinary working-days, allowing him to clean up at least one half of his territory each day, and thereby lifting the garbage once every forty-eight hours.

The bed of the vehicle or wagon to contain the garbage should be constructed of steel or iron, and built water-tight, the lids fitting so as to avoid the emission of odors, the ends slanting so as to permit washing out and cleaning, and the general construction should be so adapted that loading and unloading can be done promptly. Vehicles are being constructed with this end in view, and as the demand increases the character of the wagon required will prove equal to the demand.

Having expressed my views upon the first two propositions involved in the subject under discussion, it remains for me to take up the last phase of the subject—namely, the system by which it shall be destroyed.

The primary object in the disposing of garbage is to prevent contagion and disease, and no system contemplating the disposal of garbage is complete unless that end can be reached.

In a number of cities the officials in charge of this matter have been induced to consent to the construction of immense plants for the purpose of reducing garbage, believing that the system of reduction is accompanied with economic results, and from the profits arising from the sale of the products they can in time be made self-sustaining; but it is my experience, after a careful investigation, that the primary object—namely, to prevent accumulation of filth and disease-breeding conditions—can not be accomplished unless all matter and material to be found in the garbage-box can be successfully incinerated and totally destroyed.

It is evident that the reducing process which offers marketable product for speculation is rapidly becoming a question of financial results, and an

avenue for investment and speculation, and the healthful condition of a community and the sanitary regulations to prevent contagion and disease have become minor objects where the disposal of garbage is open to speculation. Therefore the theory of a self-sustaining plant is erroneous, and must give way to a more practical and more certain method of meeting this demand upon the departments of city governments.

There are many other objections that could be urged against placing so serious a subject within the reach of speculators and capitalists, and there are sanitary reasons why a reducing process which does not destroy should not be encouraged.

The refuse-matter necessary to be collected comprises garbage, night-soil, and rubbish, and in many cities where the sewage system is not sufficient the destruction of night-soil becomes a serious question, and plants constructed for the purpose of reducing garbage do not destroy this character of refuse-matter; yet it is essential, in order to have good sanitation, that the system adopted for the purpose of disposing of garbage should include the destruction of all kinds of disease-breeding materials or rubbish.

If the complete destruction of night-soil can not be accomplished by operation of the reducing process, cities will be compelled to find other means of destruction, thereby causing the erection of a crematory for the purpose of consuming night-soil, besides maintaining a reducing plant. This double expense can be avoided where a system is adopted that contemplates total destruction without regard to the marketable product that may be obtained through a reducing process.

If we keep steadily in view the primal object, and determine that the necessities of a city are sufficiently great to warrant rapid and complete disposal of garbage, we will readily reach the conclusion that the cremation of the same and its complete and thorough destruction by means of combustion will afford the remedy.

It may be urged that furnaces can not be constructed which will give entire satisfaction, and completely destroy night-soil, garbage, etc., without emitting offensive odors, to the annoyance of the people living within the vicinity of the crematory; but I hold that the question can be satisfactorily solved, and that the duty now devolves upon the administrative departments of our various cities to foster and encourage the development of garbage crematories, in order that, as the demand for the same may exist, such devices may be constructed as will sooner or later overcome all objections urged against some of the present devices.

It can not be successfully urged against the crematory system, which totally destroys the garbage, that the expense of construction, collection, and final disposal is too great, nor can a comparison which can be successfully sustained be made to the disadvantage of cremation, as between the two theories of consuming garbage, either by the reducing process or its total annihilation by combustion, when we take into consideration the

primal object for which these crematories are constructed, and the benefits to be given to the people by the successful disposal of their garbage.

This can be accomplished through the operation of the administrative boards, the expense of which should be paid out of the general fund, and the responsibility for the healthful condition of a city should be borne by the officers.

It has been my purpose, in what little I have said upon this subject, to establish a principle—namely, that the disposal of garbage is freighted with a high moral condition that can not be set aside for the purpose of creating revenues upon investments, but demands the scrupulous and honest efforts of municipal departments.

True, it becomes the duty of the official in charge to so manage the cares intrusted to him that the expenses incurred may be kept to the minimum, and the very best results to be obtained at the lowest possible cost; but it is equally true that he should be sufficiently capable, mentally and morally, to determine that sanitation is essential to the health and prosperity of the citizen, and the real question in economics for him to consider is how much will it cost to thoroughly and completely dispose of garbage, and when he has reached the conclusion, and has honestly and efficiently directed the destruction of this offensive necessity to habitation at the lowest possible cost, he will have solved one of the highest problems in municipal economics, and will have performed a duty the reward for which a grateful community will ever commend.

THE PRESIDENT: Gentlemen, are there any questions that you would like to put to the gentleman who has just read his paper?

MR. BROWN: I should like to ask what furnace is used.

MR. DEVILBISS: I will say to the gentleman that we are constructing a Dixon furnace at the present time, and we have not yet had time to give it a practical test. There are several constructed in the United States. There is one at Atlanta, Ga., one at McKeesport, Pa., and several other places; it is a furnace that destroys all kinds of garbage, night-soil, and rubbish of every description by combustion.

MR. BROWN: Does it require any extra fuel?

MR. DEVILBISS: Yes, sir; either coal or gas to start the fire.

MR. BROWN: Is it self-sustaining after that?

MR. DEVILBISS: This is to dry out the garbage; after that operation it takes very little fuel; we think it will take a ton of coal per day.

MR. BROWN: For how much material?

MR. DEVILBISS: Our furnace consumes two and a half tons per hour.

DR. HESS, Cleveland, O.: You make no effort at all to save any of the fats that are contained in the garbage by your system?

MR. DEVILBISS: No, sir; we burn every thing.

DR. HESS: The object then is total destruction?

MR. DEVILBISS: Yes, sir. As I said before, we have not put it to a practical test yet; but we expect as soon as our crematory is finished to put it to a practical test, and we can not give the information now, but I think that in about four weeks we will give our crematory a test.

DR. HESS: Mr. President and gentlemen of the society, as the writer of the paper has well stated that the health of a community is its most vital question, as a community that is not healthy should not be inhabited by anybody, therefore the question of keeping the sanitary conditions of a community at the highest standard is one which should command the highest consideration on the part of its officials. While the question of garbage disposal is confronting all large municipalities as well as small ones, practical observation has demonstrated that the total destruction of garbage by the crematory system is a willful waste of good material. In considering the garbage question we should take in connection with it the dead animals, the disposition of which is of equal importance; we should take into consideration the question of the value of that material, and the system of disposal should be adopted which is nearest self-sustaining. By practical observation it has been demonstrated that garbage as a whole, which includes the dead animals of the community, contains from six to seven per cent of fat, which sells on the market at three and a quarter cents per pound net, so that a community of the size of Cincinnati or Cleveland (of which city I have the honor to be a representative) or Milwaukee (which our worthy President represents) will furnish material of considerable value. By the Merz system of reduction, which is used in Buffalo, it has been demonstrated by the books of the concern that the method is absolutely self-sustaining, and the bonus which the company gets goes to the profits of the concern. Should the plan of total destruction by cremation be adopted, the cost of fuel, labor, and other incidental expenses necessary for its accomplishment would approximate the expense for operating a system of reduction, at the same time getting no return whatever. As the quantity of grease contained in all garbage averages about two and five eighths per cent of its total bulk, excluding dead animals, the value of the products

of a reduction system are unquestioned, and total destruction should not be considered. For several years the city of London, England, has been operating a plan known as the Ramage system; this method is to precipitate all the liquids of the garbage by the addition of sulphate of alumina and lime-water, subsequently sterilizing the residue by ozone, after which it is passed through hydraulic presses for driving out the excess of moisture, when it is placed in driers, and naphtha is added to remove any remaining grease. After the grease is all removed from the garbage, and it is thoroughly dried, it is ground up and used as a filler for fertilizing materials, as in the Merz system. The representatives of the Ramage Company called on me at Cleveland a short time ago, and assured me that the cost of a plant for disposing of one hundred tons of garbage a day would cost about fifty thousand dollars, and the operating expenses of the same would be in the neighborhood of about twenty-five or thirty dollars a day; so that when we come to think of disposing of the garbage in our cities the value of its contents should be carefully considered. Then another company went so far as to extract the fats from the garbage, passing it through a purifying process, and selling it for making oleomargarine. [Laughter.] Another company went so far as to guarantee that they could take the garbage that was collected from the city, extracting the fats therefrom and converting it into oleomargarine, taking the residue and making it into soup. [Laughter.] Referring to the question of municipal collection of garbage, I think from what I have been able to learn that it would be rather an expensive undertaking for cities to adopt, on account of the political complications that are likely to arise in connection with it. A garbage plant that would employ say in the neighborhood of a hundred or one hundred and fifty or two hundred men would necessarily become a part of the political machinery of the community, and it would be made subservient to political influences. In place of the quantity and character of the work performed by a man would be the amount of political influence he wielded in his ward, and his position as a collector of garbage would be given in consideration of political services rendered. On the other hand, where the collection is let on contract it becomes one of business alone; the details of the work will be prosecuted without fear of the loss of a vote at a coming election. I have been informed the city of Cincinnati has placed the collection of garbage in the Department of Public Works. On account of the miscellaneous character of the work the teams have

to do by going for a load of garbage and bringing back a load of stone, then going for a load of ashes, it has been impossible to arrive at the cost of collection. The city of Buffalo pays \$40,000 a year for the collection of garbage alone and \$30,000 for the disposition of the same. The city of Cleveland, which I feel very proud of, I am very sorry to say has no modern system of garbage disposal; but we are active and energetic at the present time in the hope of securing one of the best methods, and to have it in operation by next spring. [Applause.]

THE PRESIDENT: Are there any other remarks?

MR. MUNRO: I would like to inquire of the gentleman if they separate the garbage from the ashes, and how they regulate that?

MR. DEVILBISS: In our community we have no ashes; we burn natural gas. I would like to say just one word in regard to the collecting of garbage. The city can collect the garbage just as well as any company. We propose to divide our city into districts as soon as we have made a practical test of our crematory, so that one man, as stated in the paper, can go over a certain district and have the garbage collected every other day. We will advertise for bids for the collection of garbage in the different districts, say not more than two districts to one man. We will furnish our own wagons with metal boxes, because the wagons have a good deal to do with the sanitary conditions of collecting the garbage. It can be readily dumped into the furnace and burn every thing up in the shape of garbage. Ashes, properly, is not garbage, and it has nothing to do with the garbage question.

MR. MUNRO: Now, gentlemen, as the last speaker on the floor has advocated the contract system in preference to regulation by municipal control and by the municipal body itself, I say I think it is impracticable; and as we now in Omaha have the contract system, and have seen its workings and every thing that is connected with it, I must say, as a representative of that body, that we have found out that it is not a success whatever. That you will find where the city leaves the contract out, either by assessing the cost against the property-owner or tenant, as is usually the custom, as the gentleman who has read that paper said, that you do not get the results; that the poor people of the city will manage to evade and get rid of their garbage either by throwing it in the alleys or disposing of it in the night-time some way to the detriment of the public; and it is impos-

sible, no matter if you have a whole army of inspectors to watch these districts, to lay the blame on any one; so that therefore we, after a trial of this system, have found it to be somewhat of a failure, and we are in favor—the great majority of the people of the city of Omaha would be in favor to-day if the contract had expired—of going ahead under municipal control, so that it does not cost the individual any thing; then assess the tax and pay it out of the general fund. Thereby you do away with the inspectors, just because every person who has an interest in the health of the community, if he can get his garbage disposed of without any cost, then certainly every one who has any pride whatever would be perfectly willing to dispose of it in that way, and I believe it is the proper way and the only way to dispose of the garbage system, and I do not believe it would be a detrimental system. Now, in regard to the crematory part of this discussion, I visited about a year ago Salt Lake City. There they have a crematory and dispose of the garbage by cremation. As you all know, Salt Lake is situated in such a place that the only way they have of disposing of their garbage is by hauling it into the country or by cremation. They have tried the former method and it proved a failure, and they were using the latter when I was there with perfect satisfaction. I could not state positively what kind of furnace they use, but think it is the Dickson, the same as the gentleman who preceded me has spoken of. The city, I believe, has a population of about 75,000, and they had one crematory furnace which disposed of the entire product, consisting of dead animals of all kinds and every thing else pertaining to garbage except ashes. The furnace consumed from two to three tons of soft coal per day. The city furnishes the receptacles in which to place the garbage, and they also have their own teams, which call at certain periods and transport the garbage to the crematory. The plant is situated outside the city limits, and I could not discover any disagreeable odors either in or around the plant. I was very much pleased with their system, and the city officials, together with the people of that city, were very enthusiastic over the benefits to be derived by advocating the crematory system for the disposal of garbage. I believe the preservation of the health of the people is much more important and desirable than any profit the city might derive by letting by contract the disposal of garbage, or by any other system of a similar nature. In fact, I have always been, and am

now, an earnest advocate of the system of municipal control not alone of garbage, but of every thing else pertaining to a city, where such a plan is feasible.

MR. HATHAWAY: I would like to hear from the city of Buffalo. They have had a practical demonstration of the disposition of garbage for several years, and I understand they are in the front rank on this question, and I would like to hear from Chief Engineer Field.

MR. FIELD, Buffalo, N. Y.: Mr. O'Shea is here, and I think he can tell you more on the subject than I can.

MR. O'SHEA: Mr. President and gentlemen, I agree entirely with Dr. Hess, of Cleveland, in regard to the reduction system. I think the trend of opinion of people who have gone into this question seriously is towards the saving of all products that can be saved from garbage or kitchen offal, and this embraces, as he has stated, dead animals, which in most cities are treated in connection with the garbage. In the city of Buffalo the street department, of which I have charge at the present time, looks after the ashes and garbage collection and disposition, while the disposal of dead animals is entirely in the hands of the health commissioner, and is treated at one of the rendering establishments immediately outside of the city. We have a contract at present for five years with the Baynes Garbage Crematory Works, operating the Merz improved system, and pay them \$35,000 per year. They treat all the garbage and kitchen offal of any description we deliver at their works, which are located immediately beyond the city limits. They do not handle the carcasses of dead animals, but I understand they have at present the question up with the Health Department of taking this in. When they started their plant they did not have facilities to care for horses and other animals. We handle the question of garbage entirely by the municipality. We have tried the contract system, and we have voted it a very large failure. In reference to the political end of it, we do not believe that with proper municipal government there is any danger of politics creeping in. We divided the city of Buffalo into eight districts, and the collections are made in each district entirely distinct and separate, and we operate them the same as if they had nothing at all to do with the general city collection as far as mixing them up in the management is concerned. In the business district we collect every night except Sunday, and in the residence district from the first of May to the first of November twice each week, and from the first of November to the

first of May once each week. Our ordinance permits no garbage or ashes to be placed on the street. The employees of the department are obliged to go upon the premises and get the material and place same at the curb, when it is collected. The maximum time receptacles are allowed to remain on the street is about one hour; the average time is a half hour. We disinfect the garbage when it is dumped into the wagons and while en route, also disinfect receptacles before they are returned to premises, so that we try to minimize the odors that will naturally come from the collection of garbage. The ashes and all matter outside of garbage proper is supposed to be kept in separate receptacles, and is used for filling low lands in our city. We are at a disadvantage in reference to this disposition on account of not having at present very much low land to fill. We are in rather a flat country, and this item of expense is large for the reason we have long hauls to dispose of the material collected; this applies to garbage as well as ashes. Our crematory is located in the town of Cheektowaga, and from the north end we have to haul a distance of seven miles, and the minimum is perhaps two and a half. And I think the gentleman from Indiana who read the paper will find, if he undertakes to make a collection on the basis of what one man and one team can do in a day, making his collection every forty-eight hours, that if his team is worth any thing it will cost a great deal of money, and that he better employ more men and get the value of his team. A team in Buffalo costs forty cents an hour, and a man costs fifteen cents an hour. I do not know that I can say any thing more. If any gentleman wants to ask any questions, I will be glad to answer them.

MR. DEVILBISS: We have our garbage placed in the alleys very conveniently for the collection of the garbage; it is placed in small cans made for the purpose of receiving the garbage, and all the collector has to do is to pick up the can and dump the garbage into his wagon and drive to the next place. We propose to collect all our garbage in our city with five teams; the total expense of collecting and cremation will be twenty-seven dollars a day for a city of forty thousand inhabitants. I would like to know of the gentleman of Buffalo, if there is any profit derived from the reducing process, who gets it? It certainly goes to the contractor; the city does not derive any profit from it, and you lose entire sight of the sanitary question. The city should not be a party to the speculation and scheme. There

is a gentleman of the city of Los Angeles or San Francisco who offers big prices for the privilege of collecting the garbage, and expects to make it off the poor householder or the poor man, out of which the city gets nothing at all, and is made a tool for the purpose of making money for the contractors.

MR. O'SHEA: I can not understand why the city is interested one way or another. The primary interest of the city is the health of the community and the sanitary condition of the city; and if the system of reduction is the most desirable from its standpoint, the fact that the company operating it may make some money I do not think pertinent at all. They are not in the business for their health, whether they run a crematory or a reduction system. If the reduction system can be operated, as far as the city is concerned, at less expense than the crematory, that is the only aspect that the city is interested in, always basing the initial step upon the sanitary condition. Now, whether the sanitary condition is arrived at through the crematory or the reduction system, I do not suppose you will find very many people who will care. The first thing that every city should do is to decide upon the system that will give them the best sanitary results, and the cost is the second consideration. If they are convinced that it is the reduction system, they should adopt that; and if the company operating makes some money, I do not think that interests them at all. In the city of Pittsburg they use the burning system, and they can save by handling the ashes about five per cent, getting a product equal to the wood ash, and having a commercial value. The Engle furnace that is in operation in Lowell, Mass., and Des Moines, Iowa, is similar to the Ryder furnace in Pittsburg. The city of Cincinnati after considerable investigation has decided upon the Simonin system, and this system is in operation in New Orleans and was in Providence, R. I. Dr. Chapin, health officer of Providence, is practically the father of this system. They use the naphtha vapor for extracting the oils, and they treat every thing connected with the garbage as it is found on delivery. The Merz system originally did not treat as delivered, but separated cans, bottles, and all that class of matter from what they considered garbage proper. In Buffalo we would not listen to that arrangement, because our health commissioner and the other officials in charge of this matter felt that garbage—all refuse of any description that might remain in the can or bottle—was just as apt to create disease as the garbage that would go into the receptacle proper, and we insisted, and have in our contract,

that the garbage should include bottles and every thing that comes from the kitchen, and shall be so treated. It is unloaded into cars at the crematory, and from them directly into large vats, which hold twenty tons each. It is there treated by the naphtha vapor, and I think Dr. Hess and the other gentlemen who are interested in the garbage question will agree that this takes away absolutely all bacteria or any thing of that description. Is there any other gentleman who desires to ask any thing about this?

MR. DEVILBISS: I would like to know what you do with the night-soil?

MR. O'SHEA: We have very little of that. Our people have flushing closets all over the city of Buffalo. I do not think there are more than one hundred and fifty vaults in the city, and these are under the supervision of the health commissioner, who is doing away with them as fast as possible. The night-soil collected is hauled out eight or ten miles beyond the city and given to the farmers, who are very glad to get it for the purpose of fertilization. We do not allow any of it in the city of Buffalo.

Here Second Vice-president Wm. H. Kerr took the chair.

DR. HESS: Mr. President, I would like to offer, by way of explanation, that the system that I had advocated was the levying of a tax on the general duplicate to cover the expense of collecting, thereby preventing the company who secured the contract for the collection and disposition of the garbage of having any thing to do with the people at all; thus the raising of funds is under municipal control, the health department regulating the sanitary feature of the work. If the city should let the contract for collecting and disposing, its obligation would end by simply paying for these two items; were the city to undertake the work itself, the cost would multiply.

MR. DEVILBISS: I understand from the gentleman from Buffalo that they pay \$35,000 for the reduction of garbage?

MR. O'SHEA: That is all a question of how the municipality decides to do its business; there is no iron-clad rule. For instance, when we made the last contract with the Merz people at Buffalo we had bids from the Simonin, the Engle, the Ryder, and the Merz people. Our first bids were on the basis of tonnage delivered, we to pay them so much for every ton they destroyed. The Simonin people came up with this proposition, and I think they made it also in Cincinnati and in every city where they bid. They will build a crematory

and destroy the garbage that is delivered by the city for so much a ton, or they will destroy it on a lump-sum basis. They will build the crematory at an expense guaranteed not to exceed a thousand dollars per ton capacity; they will lease from the city for a nominal sum, say one hundred dollars, and then they will destroy all the garbage of the city for nothing, and pay so much a ton—I believe twenty cents—for all the garbage delivered. In a city that can float its bonds at three and a half per cent, the crematory, including the land, would cost over one hundred thousand dollars, and the interest on this would be \$3,500. The city would get twenty cents a ton for all the garbage that is delivered there, and it would cost them nothing for disposal—that is, outside of the interest mentioned—and at the expiration of the contract the plant would revert to the city, and they can operate it as they please. We did not believe we wanted to build any crematory or go into that business. We asked these people, “What will you destroy the garbage of the city of Buffalo for on a five-year contract?” The lowest figure we could get was \$35,000, and they had to build their own plant, and protect the city against any lawsuits for damages and nuisance. The plant is always under the supervision of the health commissioner and also the State Board of Health, which has just been in the city of Buffalo looking over the crematories there. It is the same as municipal lighting; one city wants it and another does not. There is no iron-clad rule laid down; every man thinks for himself and every community for itself.

MR. HERRMANN: Do I understand you to say that your contract is for five years?

MR. O’SHEA: Yes, sir.

MR. HERRMANN: And it costs you \$35,000 per annum?

MR. O’SHEA: Yes, sir.

MR. HERRMANN: Does that include the animal offal, or simply the collection and destruction of the garbage?

MR. O’SHEA: We collect ourselves; it costs us \$40,000 a year to collect the garbage.

MR. HERRMANN: I want to state for the information of the society that Cincinnati also has a garbage contract. We do our own collecting here; the same is delivered at the foot of one of our principal streets, about a mile from this hall. The garbage is then towed down the river some six or seven miles to the plant of the company having the contract. Our contract runs for ten years on a sliding

scale, and averages about \$21,000 per annum. We designate where the plant should be located.

MR. O'SHEA: This is with the Simonin Company?

MR. HERRMANN: The Simonin process.

MR. O'SHEA: The restriction placed in the city of Detroit is that the plant must be located at least twenty miles from the city of Detroit, and the Merz Company there collect the garbage in the city, and I believe their contract for the collecting and disposition annually is \$63,000. In St. Louis they have a Merz Company also. I believe they had one in Milwaukee, and one in Chicago, which has been abandoned, and perhaps the health commissioner of Chicago can tell us about that. They are now trying two or three new furnaces there. In the city of Boston they have what appear to be very primitive methods; they collect their garbage under the direction of the street department, and I think they have five yards where the garbage is separated, and the best portion sold to the farmers in the surrounding country; the balance of it is taken to the sea and dumped. They have had complaints from the city of Gloucester and all along the coast about the refuse being washed on the shore, the same as the city of New York has had, and the health commissioner there, I believe, stated that the deaths from typhoid fever on account of the feeding of garbage to the cattle in the surrounding Boston country was something that could not be determined, and they have been advocating very strongly some other system of disposition. I think they have tried four systems of cremation, and they have not decided that they have a good one yet. In Glasgow, Scotland, they have a system for disposal of refuse as good as any city in the world, and it is done, as most of Glasgow's business is, by the municipality; they believe in Home Rule, and they collect there almost daily. They have immense plants that cost them, if I recollect right, something like \$400,000; they separate their ashes, and it is supposed to be kept separate from the garbage; they run that through machinery, and the bones and glass and every thing of that kind they take out and sell; the cinders they separate and get sufficient fuel to run all their boilers and engines; the balance of it, the fine dust I presume it is, they mix with the night-soil and make a fertilizer, which they sell to the farmers, and they also have a farm of some thousand acres that they are reclaiming and operating for the municipality. If the gentlemen want to find ways to get at the disposition of the garbage, they can

find it by looking up the statistics; there is no dearth of information. Perhaps at Buffalo we are behind the age; we think we are pretty well up.

MR. BENZENBERG, of Milwaukee: For the information of the gentlemen I will state that we have had great trouble in the disposition of the garbage previous to three years ago. We now have a contract for the removal of the garbage in the manufacturing district and in certain residence districts every day, and in all the balance of the city at least three times a week. The garbage is removed in iron water-tight tanks, in the shape of a removable box, that can be lifted by a derrick off from the frame of the wagon, and is collected during the daytime from receptacles which under the ordinance are to be provided by every householder or business man, and which keep the garbage entirely separate from the ashes or other refuse. The garbage is carted to a large barge, which carries it about fourteen miles up the lake, where it is conveyed and delivered by an inclined railway into the tanks of the Merz system—the reduction system. We pay \$25,000 a year for the reduction of the garbage, increasing \$2,000 each year, and \$43,000 for the removal of the garbage. The garbage is reduced according to the Merz system. The reason of our having it removed that distance, and obliging the plant to be located fourteen miles north of the city, is to remove all the criticisms that might arise in regard to offensive odors. It is giving perfect satisfaction. Provision is made that in case the lake is too rough, or if in winter-time the lake is so covered with ice as to prevent the removal of the garbage by boat, one of the railway companies, which has run a sidetrack to the plant, will remove the garbage for the contractors at a fixed sum, so that the removal of the garbage every other day at least is provided for in any emergency. The system is perfectly satisfactory.

MR. JOHNSON: The gentleman from Fort Wayne has stated that the total cremation process will cost his city twenty-seven dollars a day. Now, I want to inquire if these systems referred to by the gentlemen from Buffalo, Milwaukee, etc., the reducing process, will apply to a city as small as 40,000 inhabitants; and, if so, what will be the cost of such a system for such a city—between the total cremation process and the reduction process?

MR. O'SHEA: I do not know of any city in the United States that owns and operates the Merz system; I think it is all done as in

Buffalo, Milwaukee, and St. Louis, by a local company. I presume the Merz people would be very glad to sell a plant to the city. I do not know of any company, whether it is operating a crematory or a system of reduction or any thing else, that has given out its books for the inspection of the public. Dr. Hess thinks that the crematory of Buffalo is self-supporting; that may be possible, but they have never told us so; they have tried to make us believe that they were losing money when they put \$35,000 on what they get for their product. If proper business methods are introduced, I do not think there is any question but that the reduction system gives valuable products, such as heavy oils and grease. The naphtha that is used for extracting the oils in Providence, and I think in Buffalo, is drawn off with the oils, and then brought back again, so that it is used several times. The Simonin people in Providence put the dead animals in their cylinders; they cut the horses up, and treat it all alike, and I think they do the same in New Orleans. The Ryder crematory in Pittsburg, which I visited, certainly gives no offense that I could see; they use gas there. Nothing but the ash, similar to the wood ash, can be saved, and it is so small that nobody seems to save it; nothing can be saved except that five per cent of ash, which is the maximum, so that when you undertake to cremate garbage you get nothing back. In reference to receptacles always being placed at the curb, and being of such convenient size that a man can lift them up very easily, if they do that in the city of Fort Wayne, why, the city of Fort Wayne is blessed. I think the world is moving very fast around Fort Wayne if they can get the people to live up to the ordinance. We can not do it in Buffalo, and I do not see how they can do it in any other city in America.

MR. CAPPELEN: For the information of the gentleman I will state that at present in Minneapolis we have a contract for the disposition of our garbage with a private concern—that is to say, the company removes the garbage by cars on a railroad, and the city takes care of the delivery of the garbage to the company. They get a certain sum per annum for five years: \$14,000 for the first year, \$17,000 for the second and third years, \$20,000 for the fourth and fifth years, and in addition to the sum that the city of Minneapolis pays the contractors they receive a fee for every barrelful of garbage and every load of manure delivered to the company, and it works two ways. The contractor removes the material of the city and uses it for fertil-

izing purposes on farms, and the city has to attend to the collection. Now, that is done by city inspectors of the health department. Of course the city is interested to get rid of all the garbage; the contractor is interested in getting as much as possible, because he gets six cents a barrel for every barrellful of garbage, and he gets twenty-five cents a load for every load of manure, so he is interested in seeing that the city is kept as clean as possible; but I think the citizens are suffering, because it costs entirely too much money; otherwise it is working in good shape—that is to say, the city is kept very clean that way. We used the Engle crematory four or five years ago, but there was a little bit of odor coming from the crematory; however, enough for political pull to run it down and destroy it.

MR. HERRMANN: Mr. President, I move that Dr. Mary E. Donahue, of Cincinnati, be allowed to read a paper.

THE PRESIDENT: Gentlemen, you have heard the motion, that Dr. Mary E. Donahue, of Cincinnati, be permitted to read a paper. Are there any remarks on the subject? If not, all in favor of the motion will signify it by saying aye.

Motion carried unanimously.

MR. KERR: If the convention will pay attention to the chair, I will say, from the expressions heard here, that the garbage question is a conundrum. Referring to Chicago, I desire to say that I have taken some time this summer in looking up this question as commissioner of health of that city, and the further one goes into it the further away he seems to get. We have a proposition confronting us of six or seven hundred tons of garbage in a day; it has become one that must be settled, and we are very serious in the consideration of it. It has been truly said that Glasgow stands first in that regard, from the investigations I have been able to make; the reason for that in my mind is that Glasgow is under what may be termed civil-service rule. [Applause.] Chicago, desiring to lead in that matter as in all others, has put herself under civil-service rule, and therefore we have no fear of politics entering into the question of the disposition of garbage. The question has been considered by a commission appointed by the mayor of New York, which probably some of you have seen, and the report of that commission is what might be termed the result of his investigation. They give histories or descriptions of the various crematories, both for reduction and for destruction, but they make no recommendation of any kind. Now,

gentlemen, I think that this is one of the most important subjects that this body can ever consider right in the near future, and I therefore call upon the Secretary to read the resolution which is now upon the table.

THE SECRETARY (reading): "Resolved, that a special committee of three of this body be appointed by the chair, whose duty it shall be to investigate and report at the next annual meeting the best and most practical method for the disposition of garbage in cities.—William R. Kerr."

Which resolution was adopted.

MR. HATHAWAY, New Bedford, Mass.: We have a system of disposing of our garbage which, perhaps, to some of you would seem somewhat primitive, but still it disposes of it, and to our entire satisfaction. We have entered into a contract with a party for the sum of about \$12,000 a year. We are a city of rising 55,000 people. The city is situated along the river-front, or arm of the sea, from four and a half to five miles, being longer one way than the other. Our width possibly would average one and a half miles to two miles. The garbage is collected three times a week. The collector takes it from the rear of the premises, and returns the tubs or receptacles used for the purpose. These are furnished by the citizens from whose premises it is taken. It is emptied into a wooden tub constructed for the purpose, which is about the height and size of an oil-barrel. The rim of the cover is about a foot deep. There are eight of these tubs on a low gear drawn by two or three horses. We have no trouble, to my knowledge, of any obnoxious odors in the transportation through the city. The contractor conveys the garbage into the country, his longest haul being about seven miles and his shortest about two. He spreads it upon land of his own, and it is not allowed to remain on the land exposed more than from one to four hours. It is plowed under, and of course is a rich dressing for the land. He is building up a farm of rich, productive land, and is raising some wonderful crops. The question of ashes is a separate question with us. The city collects at its own expense, owns its teams, hiring its own men under the direction of our Public Works. These are dumped in various places for filling, where needed, as every city has for the disposition of such matter. We have investigated the subject of cremation, but have done nothing as yet. Our way seems to be best for us, and, as I said at the outset, is working to our entire satisfaction.

THE PRESIDENT: Gentlemen, if there are no further remarks on this subject, the chair will call upon Mr. Van Duyne.

STREET-PAVING IN NEWARK.

BY HARRISON VAN DUYN, PRES'T STREET AND WATER COMMISSIONERS,
NEWARK, N. J.

So much has been said and written about the proper street-paving for cities that any further discussion of the subject must be partly, at least, a repetition of what has already been said. Still, a body of men representing the practical work now being carried on in the improvement of so many of our cities can not very well meet without exchanging views upon this important subject.

In the early efforts made by those in authority to literally get out of the mud cobble-stones were quite extensively used, and older cities still have many miles of this pavement, which possessed one or two important qualities the improved pavements of to-day are more or less lacking in; those qualities are their durability, and the fact that they required hardly any outlay for repairs.

It is a historic fact of Newark, N. J., that upon the visit of Kossuth to this country in the early '50's there was a parade given in his honor. A day or two of heavy rain preceded the day of the parade, leaving the condition of our main Broad Street such that a canal-scow was dragged through the mud for a block or more with the procession. Perhaps this was the "last straw," for soon after the street was paved with cobble-stone, which remained and did its work for nearly forty years.

A very few years ago it was removed, although in the same condition as when laid, and oblong granite block was substituted. This I think is now the standard pavement when laid upon a concrete base for the main business thoroughfares of any city. Even this pavement will wear rounding under very heavy traffic, but where traffic is light it lasts indefinitely and without expense for repairs. Pavements of this kind laid even on sand have been down twenty-five years or more with us. They have required no outlay for repairs, and are still as good as when they were laid. But granite is rough and noisy, and the demand for smooth pavement is so great that, except where traffic is very heavy, it is being replaced by less durable pavement.

Telford or macadam furnish ideal roads for park drives, where they are looked after and sprinkled daily; but for city streets or avenues thickly built upon, the accumulation of dust, together with their unsanitary condition, makes them simply unbearable. Perhaps their light first cost is their principal recommendation, but the constant outlay for repairs afterwards place them among the most expensive pavement.

The most popular improved pavement to-day in many cities is asphalt. At the initial meeting of our society last year in the city of Buffalo, where so many courtesies were extended to us by her citizens, perhaps next to

the fine excursion on the lake and down Niagara River with the magnificent view of Niagara Falls was the enjoyment afforded us by the drives through the city over many miles of its fine avenues covered with this smooth pavement. While it is especially a sanitary pavement, comparatively noiseless, and when kept in good condition gives satisfaction both to those who travel upon it and to the residents along its line, still it has its disadvantages too. Unlike granite, it is affected by the changes of temperature from extreme heat to extreme cold, and also from the action of water upon it, so that, whether the travel is heavy or light, it loses its strength and disintegrates, thus needing a constant outlay for repairs.

Perhaps the representatives from other cities can give us some facts that will determine the life of this pavement, but I have doubts if its life is longer than from twelve to fifteen years. I will not leave the subject of asphalt paving without mentioning another difficulty in connection with the extensive use of it, and that is the fact of its control being practically a monopoly. If the claim made is true that the Trinidad-Lake asphaltum is greatly superior to the land asphaltum, a city virtually places itself in the hands of the one company which controls all the lake asphaltum if it does much paving of this kind, and people are justly suspicious when extensive public work is carried on without any competition.

I will not occupy the time of the convention to discuss wood pavement or asphalt block, both of which are entire failures with us, but the delegation from Newark would like some definite information regarding brick pavement, its durability and cost, including cost of repairs.

We have contracts out now for a little over a million dollars' worth of street-paving, divided as follows: Oblong block, either granite or trap, nine miles; asphalt, seven and a half miles; brick, two miles.

Before deciding to put down any brick we visited several cities where this kind of paving seemed to give satisfaction, some of which have been done five or six years. However, when we were considering the ordinances, the opponents of brick brought many photographs of brick-paved streets that certainly did not look very promising. But we also remembered seeing photographs of streets paved with asphalt and granite that were any thing but flattering to either of those pavements, and concluded to give brick a fair trial. It certainly is not affected by the extremes of heat or cold, nor is water detrimental to it if the brick are properly made and selected. We are not attempting to have it take the place of granite, but are placing it in side and resident streets more in competition with the asphalt we are laying.

All of our asphalt and brick paving is laid on a solid bed of concrete, six inches in depth, and most of the block pavement is laid in the same way. While we are laying considerable asphalt, and also experimenting with vitrified brick, we have tried to emphasize the fact to our taxpayers that these improved pavements would not last like the old cobble-stone or the substantial granite; that the smooth, almost noiseless and sanitary

pavements come high, and, like all luxuries, needed constant attention and outlay.

Other cities represented here may be interested in knowing the cost of these different pavements to us. They cost as follows: Oblong granite block, on sand about \$2.10 per square yard, on concrete \$3, with one year guarantee; asphalt about \$2.70 per square yard and brick about \$2.15 with a five-year guarantee. This price includes also the necessary grading in each case, but not the curbing.

I have endeavored briefly to state my opinion of the different standard pavements, founded upon my observation of and experience with them, and now submit the subject to the consideration of the convention.

MR. HATHAWAY, Marietta, O.: I think through all this western country, especially outside of the large cities like Cincinnati, Cleveland, and Toledo, where the traffic is very heavy, you will find that brick pavements are the most popular. We thought at first in our city, as they do everywhere, we would experiment with brick; so we called for bids, and received a large number of samples of vitrified brick, both shale and fire-clay, and after examining them and reading the different tests that were exhibited to us we decided that, living in a country where shale was plentiful, we would use shale brick instead of fire-clay. Now, the process is something like this: We first decide upon the width of the pavement, which is not always co-extensive with the width of the streets, especially where the streets, as in Marietta, have been laid out quite wide; then there is an excavation made of about one foot; the dirt is removed to such places as the city authorities may decide; then it is rolled. In our specifications we required a seven-ton roller and that the subgrade be thoroughly rolled, and then coarse gravel placed on top to the depth of six inches, and that was rolled; then on top of that was put sand two inches thick; then the brick was laid; then there was a slight coating of sand put on, and it was again rolled with the same roller. Our first brick were not, however, repressed. Here comes the question of what you will take, standard or repressed brick, or what is called block, which are larger, and being repressed give beveled edges, which are a great advantage, making a brick that will last longer than those not repressed. Now the main question, it seems to me—and I have been chairman of the paving committee since 1892—the main question is to have those brick properly burned; and if you can get the manufacturer to be interested with you and to burn the brick to the proper point, and it requires an expert to do it, then you have a material that will last,

and there is no telling how long a vitrified brick will last. Now, the term vitrified as used in this business has a certain meaning. There are other words that are used, but you will find everybody has taken to the word vitrification in this connection. Burning is an important question, for if the brick are properly burned and burned to the point of vitrification, then you get a brick that will stand the same as the best stone, and it seems to me it is the coming material for pavements. Now, in regard to burning, the old-fashioned way is to use the up-draft kiln, and the manufacturers who have been using them are loath to abandon them, because it costs considerable money to change to the down-draft kiln; but you can not get a large percentage of properly-burned brick in the old-fashioned kiln, because the lower courses will get all out of shape, and the hardest brick are always in the bottom, while in the down-draft kiln the hardest brick are always on the top, and they remain in perfect shape, and you get from eighty to ninety per cent of good brick out of such a kiln. I think the proper burning of the brick is a very important question to study, and I hope that we may hear from others who have had charge of street-paving and of brick paving in this state or in other states.

MR. HARPER, Akron, O.: I appreciate the fact that I ought not to take the convention's time, but it is an important matter, and I rise simply to call the convention's attention to one point that I think is very often overlooked upon the part of the city authorities in regard to paving-brick. I speak because I have long been interested in the city work, and I have also had to do with the manufacturing of bricks for a number of years—not paving-brick, I am not interested in that—but a vitrified building or pressed brick; but I want to call the convention's attention to this one point, and one which is overlooked so often, and that Mr. Hathaway has referred to, the properly-burned brick. Now, gentlemen, do not let the idea get any more prevalent than it is to-day, that a paving-brick must be extremely hard and nothing more. What you want in a brick is toughness and tenacity, and the only way known to the brickmakers to-day to get that condition in shale or in fire-clay is by annealing, on the same principle that steel was originally annealed. Find the manufacturer who will produce for you an annealed brick, besides being perfectly burned, and you then have a brick that you can depend upon; but if you depend upon the manufacturer to put the brick upon your street simply because they are hard and consequently very liable to be brittle, you

will have that condition of affairs sooner or later. Insist upon annealed brick; that is, that the manufacturer must give time—he must give his kilns a long time to cool, and properly cool; and one of the things you want to look to is to know that the manufacturer understands that principle of thoroughly cooling and annealing his brick. [Applause.]

MR. HALL, Peoria, Ill.: We have had a great deal of experience in Peoria in the laying of brick pavements, and are as a rule in favor of, in preference to any other, the small brick. In the mode of laying them we tried, as Mr. Hathaway spoke of, a bed of gravel on a thoroughly-rolled subbase; the gravel rolled, and then a cushion of two inches of fine sand, and we have abandoned it for the reason that when the wet weather comes the water percolates through the brick and sand, across the sand down into the gravel, and you have an uneven surface, and it won't settle uniformly, and for that reason we have abandoned the gravel, and have substituted a six-inch concrete base with a two-inch sand cushion.

MR. MUNRO: Mr. President, we have about eighty-five to ninety miles of paved streets in Omaha, and I think we are in about the worst condition of any city here represented in regard to paving, as we have extreme heat and extreme cold, in the summer-time running up to one hundred and forty degrees, and in the winter season running down to thirty-five degrees below zero; so that you see that we have an extreme warm summer and an extreme cold winter. We have about twenty-four miles of colored sandstone and granite; we have about twenty-five miles of asphalt of different kinds; we have about twelve miles of brick; and we have about twenty-seven or twenty-eight miles of wooden blocks, of which there is nothing left of the most of it at present but the concrete base, so that they are a total failure; but we find, gentlemen, that the different kinds of asphalt cuts not very much of a figure; it is the people that lay them, and the manner in which the asphalt is laid, determines its usefulness and the wear and tear it will undergo. Whether asphalt is laid by a novice or an expert determines its usefulness and life. We have one street, Dublin Street, which was laid about sixteen years ago with Trinidad asphalt by the Barber Company, and that street to-day is in better condition, a great deal better, than some streets which have been laid by the same company, but by different foremen and different men; therefore you can see that it is not the asphalt but the people who lay it which determines its usefulness. We have the California asphalt,

which we have laid to-day, which we have never had before. It is not so much in the asphalt as it is in the way it is laid. Some of our streets are laid in granite, and nearly all our heavy traffic was driven on to the asphalt, because the granite made so much noise and so much racket that the people did not like to drive on it.

MR. McCORRY, Mansfield, O.: We in Mansfield have had much experience with brick and brick pavements, and were one of the first cities in the state to lay brick pavement. I am surprised that at this meeting and during this discussion we have not heard more in reference to the necessary foundation upon which to build streets. In order to have a good, substantial street pavement we must have a lasting foundation upon which to build; a foundation of not less than three feet with broken stone, gradually growing less in size, until within from six to ten inches of the brick bed, and that space filled with good, clean gravel and sand—stone, gravel, and sand well rolled with a steam-roller. This foundation should be well drained. We have much to learn from our mother countries in regard to street-building and the foundations of them. There they have lasted for centuries, and the repairs necessary to keep them up are comparatively small. The country roads in Germany, France, and England have foundations such as I have attempted to illustrate, with a depth of from three to four feet, all well drained, and frosts, floods, and the heaviest of teaming has left no impression on them. We can not lay asphalt, granite blocks, brick, or any other kind of pavement on a flimsy foundation, and expect it to last for any length of time. Neither can we lay it on a good solid foundation, pay no attention to it by repairing and otherwise, and expect a good, lasting street. We have in our city (Mansfield, O.) a street paved with the common domestic brick, taken out of the old-fashioned kiln, that has now been in constant use on a thoroughly-traveled street for more than nine years, and is now in fairly good condition. We have the principal business streets paved with vitrified brick, as it is called; but that is only a name; any brick can be vitrified by pouring salt in the kiln. It is the clay that makes the brick, together with the manner of its adaptation to brick-making when it is moulded. One of these streets has been paved with brick for more than five years, and under heavy grades and heavy traffic the wear is almost imperceptible. Gentlemen, to have good streets we must have good foundations, and the street with its paving material looked after and kept in repair.

THE PRESIDENT: Gentlemen, the convention is honored this morning by the presence of a member of the fair sex, who has been permitted by unanimous consent the privilege of the floor for the reading of a short paper. I have the pleasure of calling upon Dr. Mary E. Donahue. [Applause.]

SCHOOL HYGIENE.

BY DR. MARY E. DONAHUE, CINCINNATI, O.

To the municipal boards throughout the nation, and especially those of our large cities which by their extensive organization exert an immense influence on the national education, we commend a few points well fitted and worthy to enlist their endeavors for all time to come.

Notwithstanding the wide and general appreciation of the value of sanitary science, there still exists a widespread ignorance and consequent indifference on many points of vital importance to the nation at large. Nowhere is this more conspicuous than in the school-room. Notwithstanding the deep interest the work of education awakens at the present time, unhygienic conditions exist to an alarming extent.

Light, ventilation, heat, and cleanliness, to these closely-connected and most important features of school hygiene the present condition in many quarters is highly unsatisfactory. It is a common thing in Cincinnati to have the floors of school-rooms scrubbed annually instead of weekly.

The ventilation of schools in winter-time is seldom good. This is somewhat the fault of the teachers, who fail to make use of the means at hand.

Physical examination of the pupils should be made periodically. By these examinations, and in no other way, can certain deformities and diseases be detected and cured. Many pupils in regular attendance at school are afflicted with skin-diseases, which can be communicated to others through the common conveniences. It might be supposed that if there is one branch of school hygiene which is understood by all, and about which there is an absolute consensus of opinion, that point is the danger of infectious diseases. Many children are suffering from troubles of various kinds and degrees, which are aggravated by the conditions of the school-room.

Physical examination would detect this at once, and the children placed where the disease could not be communicated to the others. Special permission should be required in cases of this kind.

Physical examination would detect deformities, such as curvature of the spine, irregularity of the length of limb, one leg shorter than the other, etc. Troubles of this kind are more common than supposed, and could be easily corrected during school-years.

By periodical examinations sanitary precautions could be introduced from time to time, as occasion required, for the prevention of deformity. This examination would detect the vicious practices now so common in our schools—practices which lead to epilepsy, insanity, and crime.

Hernias are common among boys, and could be corrected if they received attention in time. The eyesight, teeth, skin, clothing, and food would receive proper consideration. Mentally-defective children would be properly placed.

Not only the location of the school, but the site also, should receive more consideration than they now do. Single seats, that could be so adjusted to suit the child by raising or lowering the seat and desk, would add to the health and comfort of the child.

Filtered water is an absolute necessity in all our schools. Stoppers for sinks and drain-pipes should be placed everywhere in connection with faucets and drains to prevent the escape of the deadly water-gas which has so much to do with the spread of diphtheria, scarlet fever, la grippe, and typhoid fever.

If the examination is not made thorough, there is only a temporary alleviation, for the evils of disease, deformity, and crime grow with time, and what we do not thoroughly repair will have to be done over again if the mischief is not eradicated.

This question is one of the most important character to the Society of Municipal Improvements, and deeply concerned in the future welfare of our great nation. Your decision will be a precedent for all future. I would suggest the appointment of a staff of qualified inspectors for the schools—women for the girls and men for the boys. Foreign countries have long since seen the necessity for such a course.

THE PRESIDENT: The chair is advised that we have with us this morning Commissioner Jones, of Toronto, Canada, who desires the privilege of the floor for the presentation of a short paper. What is the pleasure of the convention?

Upon motion, Mr. Jones was extended the courtesies of the floor.

MR. JONES, Toronto: Gentlemen, I have prepared a short paper giving a synopsis of the work as done in the city of Toronto. It deals with the services of street-cleaning, street-watering, scavenging, and the removal of snow from sidewalks as controlled in the city of Toronto, and it may be of some interest to the convention to know how we control these things.

STREET-CLEANING, STREET-WATERING, SCAVENGING, &c.

BY JOHN JONES, STREET COMMISSIONER, TORONTO, CAN.

For the benefit of those present who may not be acquainted with the exact location of Toronto, I would say, in brief, that it is situate on the

north shore of Lake Ontario, about forty miles from its western limit, being the capital of the province of Ontario. The city has a population of about 189,000; its area is 10,481 acres, containing over 254 miles of streets, which are paved as follows: Asphalt, about 14 miles; cedar block, about 115 miles; macadam, about 80 miles; the balance, about forty-five miles, is unpaved.

STREET-CLEANING.

For this work the City Council appropriated last year the sum of \$50,848. I must explain here that the service of street-cleaning covers, in addition to the ordinary work of sweeping and removing dirt and debris from our public thoroughfares, the removal of snow and ice from gutters, street-crossings, bridges, and roadways when the snowfall is extra heavy. Last year we cleaned 1,434 miles (lineal) of streets, the cost per mile averaging \$22.76. This figure does not include the cost of cleaning asphalt pavements. The total spent in street-cleaning proper, outside of the amounts expended on the asphalted streets and the removal of accumulations of snow from crossings, bridges, etc., was a little over \$32,500.

The work is done by rotary sweepers, chiefly during the night, excepting the asphalt, which for the period extending from May to December in each year is cleaned by the orderly system—each man having an allotment of about one quarter mile of street area; the balance of the year these pavements are cleaned with the rotary brooms, in common with the rest.

Altogether we have eight machine brooms, all filled with steel fiber. Four of these are in constant use; the others being added as occasion demands.

I have recently put two self-lifting machines in commission, which follow the winrows thrown up by the brooms, depositing the dirt in carts. I have every reason to be satisfied with their performance, both from the standpoint of economy and efficiency.

STREET-WATERING.

Under agreement made with the Toronto Railway Company last year, the track allowance over the entire city, comprising about eighty-five miles of single track, is watered by a trolley sprinkler at a cost of 30¼ cents per lineal mile, double track, covering a width of sixteen feet six inches. The remaining portions of the roadways on which tracks are laid, and all other streets except those paved with asphalt, which are not sprinkled at all, are watered by team-wagons carrying tanks holding from five to seven hundred gallons each. We have fifty of these wagons in commission.

The appropriation voted by the City Council last year for this service was \$32,000, exclusive of the cost of water. The quantity of water consumed last season totaled 55,128,150 gallons.

The sprinkling of the track portion by electric motor has been now two seasons in operation, and has given every satisfaction.

SCAVENGING OR GARBAGE REMOVAL.

This service covers the removal of household refuse and ashes from something like 60,000 houses, each of which is visited at least once per week, while in the central or congested section of the city the collections are made semi-weekly. For the efficient handling of the work the city is divided into twenty-nine sections, which again are subdivided into beats, one cart or team-wagon being allotted to each beat.

It has been our endeavor for some time past to induce householders to keep garbage and ashes in separate vessels, so that these substances might be more effectually disposed of. It is gratifying to be able to record that a large measure of success has attended our efforts in this direction.

The garbage is carted to the crematories, of which there are two in operation, one in the eastern and one in the western section of the city. Cinders and ashes are utilized for filling in low-lying lands, etc. In this connection I may state that the city has obtained legislation authorizing an agreement with the Toronto Railway Company for the removal of all waste material collected throughout the city to one dumping-place by trolley system. This agreement we hope to have in operation next year.

The plant required in the scavenging work consists of one hundred and ten horses, ninety-three carts of various patterns, and five team-wagons, all of which are owned by the city corporation; in fact, the entire plant used in each of the services mentioned is the property of the city. In addition, the carts, wagons, harness, sweepers, etc., are all manufactured from the raw material in our own shops. As far as my knowledge extends there is not another city on the continent which builds and owns its plant for the works I have indicated. The result of our experience in this connection leads me to strongly urge its adoption by all large municipalities, as there can be no doubt but that the system permits of the services being more economically and effectually performed and controlled than is possible with the contract system.

REMOVAL OF SNOW FROM SIDEWALKS.

Prior to December of 1891 a city by-law was in force, placing upon occupants and owners of buildings and vacant lands the duty of keeping the sidewalk fronting their respective holdings free of snow and ice. This regulation gave rise to a great deal of dissatisfaction amongst the public, as in practice it proved to be somewhat of a hardship. In many instances owners lived miles away from the locality of their lots, and with the best intentions in the world they found it simply impossible to tramp over with a snow-shovel after every snowfall and clean off the sidewalk. To hire a person was not always convenient. Of course, as long as the by-law was in operation the city had no option but to fine delinquents.

Considerations of this kind led the Council, some four years ago, to amend the by-law referred to, by authorizing the city to clean the snow from vacant properties in case such had not been done at the expiration of twenty-four hours from the cessation of a snowfall, the cost to be charged against the property benefited, and collected with the balance of the taxes. This system has continued in operation ever since, and on the whole has proved satisfactory. Last year we cleaned about three hundred and forty-seven miles (lineal) of sidewalks, at an average cost of two fifths of a cent per foot frontage each cleaning. There has been some variation each year in the cost of doing this work, accounted for by the difference in the weight of the snowfall and the degrees of frost. We hope in the near future to obtain legislation empowering us to commence cleaning the sidewalks at an earlier period than the one now in force—namely, twenty-four hours—in which case we shall be able to do the work much more cheaply.

In this paper I have not attempted to do more than give a bare outline of the methods by which the services I have indicated are carried out in the city of Toronto by the department over which I have the honor to preside. Speaking generally, these branches of city work show little variation in their common aspect as applied to all cities and large towns; but each community will present some modifications of this common aspect, arising from causes purely local; such, for instance, as the configuration of the municipality, the character of the population, the laws and statutes of the particular state or province exercising jurisdiction, and so on. It is, therefore, on this common ground that we may confidently expect to derive benefit from thus meeting here in convention; for in the carrying out of these services, as in every other sphere of activity, there is a "best" way, and I do not know of any surer plan of evolving this "best" way than this gathering affords.

It is needless to say that volumes might be written on any one of the four topics I have mentioned. Some evidence of that fact is afforded by the number of articles constantly appearing in newspapers and magazines, dealing with the subject in its manifold phases. It is certain that at no period in modern history was there greater or more widespread interest taken in matters connected with public health than we find to-day. Education and the recent discoveries of scientists are chiefly responsible for this. As our men of genius have slowly rolled back the veil hiding nature in her secret workings, much of what was formerly regarded as unavoidable in the shape of disease and death, from the supposition of its being a "dispensation of Providence," has been found to be rather a dispensation of dirt. Such diseases, for example, as small-pox, typhoid, some phases of cholera, etc., are proved to be essentially "filth" diseases, generated by foul air, impure water, and unsanitary surroundings.

In the light of these facts, which I think no one will be inclined to

deny, conventions of this character, where ideas may be exchanged and methods compared, are of inestimable value, not alone to those taking part in the proceedings, but to the public generally. For myself, therefore, I deem it my duty to express my warmest gratitude to the gentlemen by whose labors this gathering has been inaugurated for the privilege of being permitted to take part therein.

A DELEGATE: How are you treating the different kinds of pavement?

MR. JONES: I did not quite catch the question.

A DELEGATE: The cost of the different kinds of pavements?

MR. JONES: For the asphalt paving I pay at the rate of fifteen cents per hour, and they work nine hours a day; the other is done by the rotary broom, and there is no other cost to our streets. I clean a macadam road just as cheaply as cedar block with the machine system; with the machine I am operating I am cleaning all kinds of pavements.

A DELEGATE: What kind of a machine do you use?

MR. JONES: They are of steel.

MR. MUNRO: In cleaning the same street by machine and then cleaning it by hand, and then estimate the cost between them?

MR. JONES: No; I do not give an estimate cost of that. The asphalt is thoroughly cleaned by hand.

MR. ADAMS: You do not wash it at all?

MR. JONES: No; it would be too expensive in our city, as we have to pump all our water, and it would be too expensive.

MR. ADAMS: I have recommended to our city not to water the asphalt.

MR. JONES: I may just state for the information of the convention that I find that the motion of the car is so rapid that there is not the least dust; there is very little dust in our city on that account.

MR. BROWN, Indianapolis, Ind.: There are some figures that may be of interest in the last bids we received for the sweeping of some of our streets. We have two classes of sweepers—one is the ordinary broom sweeper, and the other is a pneumatic sweeper, which takes up the dust by the action of a current of air. We have also two classes of streets—brick and asphalt. I have figures here for asphalt streets and for brick streets which are paved entirely across, and for those which are paved only to the street-car track, the track being left for

the street-car company to take care of. With the pneumatic sweeper we have in these last contracts the brick swept for forty-three to forty-six cents per ten thousand square feet surface, and the asphalt for thirty-nine to forty-two cents for streets which are paved across, and fifty-two cents where the street-car tracks are not paved. The difference is largely because the cost is figured on the area of the asphalt, while the contractor is required to keep the dust down on the street-car tracks as well as on the paved portion. The last bids which the company using the broom sweepers made are for brick streets forty-five to fifty-five cents per ten thousand square feet, and for the asphalt thirty-eight to thirty-nine where the street is paved across, and fifty to fifty-two cents where paved to street-car tracks.

MR. O'SHEA: I would like to ask the gentleman what has been his experience with the pneumatic sweepers. Is it the Furnas sweeper?

MR. BROWN: We have the Furnas sweeper in our city, and we find that it does better work than the broom sweepers; and we have broom sweepers, hard brushes, and they are not entirely satisfactory.

MR. O'SHEA: What do you use in the brooms?

MR. BROWN: We use stiff rattan, also basswood and hickory.

MR. O'SHEA: What does your pneumatic sweeper do when the pavement is wet?

MR. BROWN: We can not use it very well when the pavement is wet.

MR. O'SHEA: Do you think it desirable to use a contrivance that you can not clean the pavement with every day?

MR. BROWN: We can not do much better with the broom sweeper.

MR. O'SHEA: Isn't it a very great objection to the pneumatic sweeper that you are obliged to stop when the pavement is wet?

MR. BROWN: Our experience is we don't do any better with the broom than the pneumatic; that is, the dirt is not carried on by the broom sweeper if it is wet; of course the sprinkler is not over the street before the pneumatic sweeper.

MR. O'SHEA: You can not use the Furnas sweeper until your street is absolutely dry?

MR. BROWN: Yes, we can not use it when it is wet; but it takes but a few hours to dry.

MR. O'SHEA: You can not do any thing with the Furnas sweeper until the pavement is absolutely dry.

MR. BROWN: It won't do any better work than the broom unless the street is absolutely dry; but if the street is absolutely dry, then it will do practically as good work as flushing.

MR. O'SHEA: Have you ever tried bass?

MR. BROWN: No, we never tried the mixture of bass and hickory.*

MR. O'SHEA: The trouble with the rattan is—of course you know how the boys do; they use them for cigars—and the very fact that you can draw from them allows them to take a great deal of moisture, and they become softened at the end. If you use the split hickory and rattan mixed, you get better results than from the rattan.

MR. BROWN: I can not speak definitely as to the rattan broom.

MR. O'SHEA: Mr. Jones, of Toronto, I think, stands alone among the men in charge of street work in America as being the successful user of steel. I do not know of any other city in the country that has been successful in the use of it. Mr. Jones seems to have the faculty of getting the proper temper; the rest who tried never seem to strike it right.

MR. DEVILBISS: I will state that we use a hickory-fiber broom altogether, and we find it gives better results.

MR. O'SHEA: For asphalt streets I think you will find that split hickory mixed with bass will give better results.

MR. DEVILBISS: For asphalt streets, we clean them by hand altogether.

MR. O'SHEA: Do you use the Boss scraper from Minneapolis?

MR. DEVILBISS: No, sir; it is a steel scraper, about three feet three inches long.

MR. O'SHEA: Do you rivet your handles into the steel or to a wooden frame.

MR. DEVILBISS: All steel. It costs us about one dollar and seventy cents.

MR. O'SHEA: Ours costs about fifty-five cents. Ours wears about three months.

* Investigation since the meeting shows that one of the smaller contractors uses a mixture of bass and hickory. He does the best sweeping done with brooms, but is not equal to the pneumatic.

MR. DEVILBISS: Ours last about a year, but it gives the best results.

MR. O'SHEA: The Boss scraper to which I refer is a patented article, sent out from Minneapolis, but I could not use them.

THE PRESIDENT: Gentlemen, they say one of the most economically-managed cities is Newark, N. J. We have with us a gentleman from that city, who will tell us about all there is in that city about street-cleaning.

STREET-CLEANING IN NEWARK.

BY HENRY E. BAILEY, COMMISSIONER, NEWARK, N. J.

Not having any financial report, and being called upon to write upon some subject, I have chosen that of street-cleaning.

The total length of streets paved up to January 1, 1895, in the city of Newark, N. J., is as follows:

Oblong granite block, on concrete foundation...	2.43 miles.	
" " " sand foundation.....	16.83	"
Asphalt	4.18	"
Trap-rock	9.99	"
Telford	40.94	"
Cobble-stone	20.67	"
	<hr/>	
Total	65.04	"
Streets unpaved	139.06	"
	<hr/>	
	204.10	"

The total cost of keeping streets cleaned and dirt streets in repair, from July 1, 1894, to July 1, 1895, was \$77,549.46, making a total of about thirty-eight dollars for each mile during the entire year.

Our main business streets are cleaned at night, using horse-sweepers, one sprinkling cart, and employing one superintendent, three foremen, one man at dump, and thirty-three laborers, and as many carts as are necessary for an average of two hundred and twenty-five loads of dirt at fifty cents per load.

The total length of these streets is four and three fourth miles, and the average width about seventy-six feet from curb to curb. The average cost of such cleaning is about two hundred and twenty-five dollars, and either two or three cleanings per week are made, as necessity requires.

It is hoped that this report will bring out a discussion as to the best way to clean streets, if by contract or otherwise.

THE PRESIDENT: Mr. Herrmann desires to make an announcement.

MR. HERRMANN: The Committee of Arrangements requests that all delegates assemble at 3 o'clock, or as soon thereafter as possible, at Government Square, where a stand has been erected. The fire and police display will take place at 3:45 o'clock. Your badges will entitle you to admission. The committee has a request to make, that every delegate and every visitor remain over to-night. We want you all with us to-night, and we will be very much disappointed if any of you leave.

MR. KENNEDY: As the hour is approaching to close this meeting to-day, I desire to say that we have listened to some very interesting discussions and papers upon the material work of municipal corporations, and it has occurred to me that it would not be improper for us to give expression to some views with reference to that intangible thing, and that all-prevailing thing, called "municipal politics." I have a resolution here which I will submit to the association, and ask that it be adopted. I will read it:

Resolved, That it is the sense of this meeting that the welfare of American cities is more dependent upon the intelligence and integrity of their public officials than upon the local supremacy of any political party, state or national.

On motion, the resolution was adopted.

THE PRESIDENT: What is the further pleasure of the convention? Gentlemen, unless there are some further remarks upon the last paper, we will now hear from Mr. Brown, of New York.

ELECTROLYSIS PREVENTION.

BY HAROLD P. BROWN (NEW YORK), CONSULTING ELECTRICAL ENGINEER
OF THE CITY OF NEWARK, N. J.

Over a year ago the Board of Street and Water Commissioners of Newark, N. J., had reason to suspect that a wholesale abstraction of the city's property was going on under their very feet, and, in conjunction with the two gas companies, employed the writer to make a thorough examination of the electrical condition of the water- and gas-pipes. Instead of making galvanometer measurements between the earth and the pipes, which are practically worthless, or mere volt-meter tests between rails and pipes, which may be misleading, a wagon was equipped with a switch-board and a set of five Weston instruments. At each halt along every street having an electric road readings were made between trolley and rail, between trolley and pipe, and between rail and pipe; the third reading was made under three sets of conditions. I will not

burden you with a technical description of the apparatus; it is sufficient to say that this method gives absolute accuracy to the result; doubly checks every reading; detects any poor contact of testing-wires or of the pipe and rail tested, and shows whether or not the feeder-wires are sufficient for their work. The time of each reading was also noted, so that the variations in power-house load could be taken into account. All of these factors must be accurately known before a correct diagnosis can be made. The average readings were then marked upon a large map, the positive being in red and the negative in green. It was then seen that the pipes were suffering badly within a radius of one thousand feet from each power-house, some readings running as high as eight volts against the pipes, while in other localities the rail-feeders were insufficient and the rail-bonds were poor. One line of rails was fifteen volts negative to the pipes; another line showed fifty volts drop in ninety feet. As some doubt was felt concerning the reliability of electrical measurements in locating electrolytic corrosion, excavations were made in the districts where the pipes were positive to the rails, and a number of badly-injured pipes disclosed. Since then it has been necessary to replace a number of lead service-pipes in the districts indicated. The board called before it representatives of the two offending roads and asked their hearty co-operation in checking electrolysis of the pipes. Both promised to do all in their power to stop the trouble. The Consolidated Traction Company has fully redeemed its promise, but the smaller road is still corroding the city's pipes.

To describe the process successfully used at both power-houses of the Consolidated Company I must first briefly define electrolysis and its causes, though I know that the subject is familiar to many in this audience. When an electric current passes from one metal plate to another through a chemical compound like water, the fluid is decomposed; its oxygen appears at the positive plate from which the current flows, and its hydrogen at the negative plate. The positive plate, if an ordinary metal, is corroded by the oxygen. When the proper solution is used, there is also a deposition of the positive metal on the negative plate, but this does not occur in the moisture ordinarily present under our streets. The current from an electric railway power-house after leaving the dynamos passes along the trolley-wire and through the motors to the rails. Here it finds two paths to follow back to the dynamo: one through the rails and their connecting wires, and the other through the moist earth to the network of gas- and water-pipes, whose conductivity frequently exceeds that of the rails. It then follows the pipes to within a short distance of the power-house, where it again passes through the earth to the rails and completes the circuit to the dynamos. The corrosion takes place at the points where it leaves the pipes. As lead suffers at more than six times the rate of iron, the lead joints and service-pipes receive the greatest amount of injury.

If the positive terminal of the dynamo is connected to the trolley-wire, as it always should be, the points where the current leaves and damages the pipes are generally within five hundred to fifteen hundred feet radius from the power-house. The corrosion of the pipes is therefore confined to a comparatively small area. If the negative terminal leads to the trolley-wire, the pipes suffer corrosion within a similar radius from the end of each line of rails, and the area of damage is thus largely increased.

In Fig. 1, *A* and *B* represent the dynamo whose outgoing or positive poles *d* are connected to the trolley-wire *T*. The current, as shown by

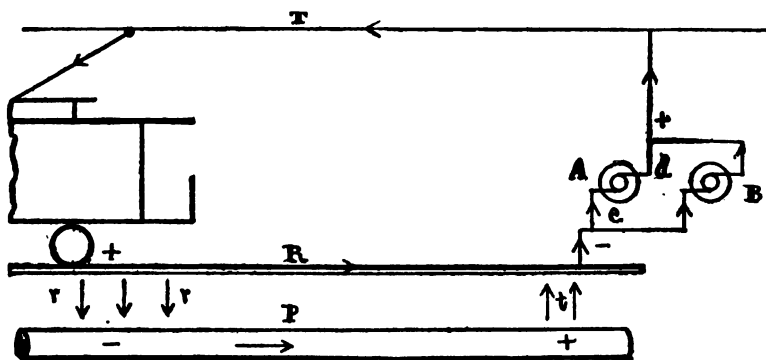


Fig. 1.

the arrows, passes along the trolley-wire, through the trolley-pole and motors, to the rails *R*. Here it has a choice of returning by the rails or by passing through the earth at *rr*, near the ends of the lines, along the pipe *P*, and again through the earth to the rails at *t*, near the power-house. From one quarter to one third of the current ordinarily returns upon the pipes. It is evident that at *rr*; where the current leaves the rails, the electrolytic action is at their expense, while at *t* the current leaves and corrodes the pipes. The rails are heavy enough to stand this loss without serious damage, but the pipes and their lead joints should never be subjected to it. In case the direction of the current is reversed, the rails would suffer at *t* near the power-house, and the pipes suffer at *rr* toward the ends of the lines. The area *rr* will always be greater than the area *t*, while the current flow at *t* will be larger than the current flow at *rr* near the end of any one line of rails, as all the current on the pipes is delivered at *t*, but at *rr* there is only the pipe current of that particular line.

The electrical joints between the rails are usually of copper wire, mechanically attached at each end of the rail. Recent tests at the Edison laboratory have shown that what is known as the thermo-electric effect

produced by a current's flowing through steel and copper contacts causes more than six times the loss due to the resistance of the metals themselves; therefore copper bonding, at its best, is poor; moreover, the resistance of these bonds is daily increased by the unavoidable rusting of the rails at the contact points and by the motion caused by the hammer-blows of the wheels. This constantly tends to increase the current flow on the pipes, and is an excellent reason for frequent electrical tests of rail joints by municipal authorities, and for the establishing of a limit of loss and of current flow at each joint. I would suggest that this limit be one thousand amperes to each nine square inches of rail section, and of one quarter of a volt loss at each joint with maximum current.

Returning to the method of pipe protection used in Newark, a plan was submitted by the writer to the engineers of the two railway compa-

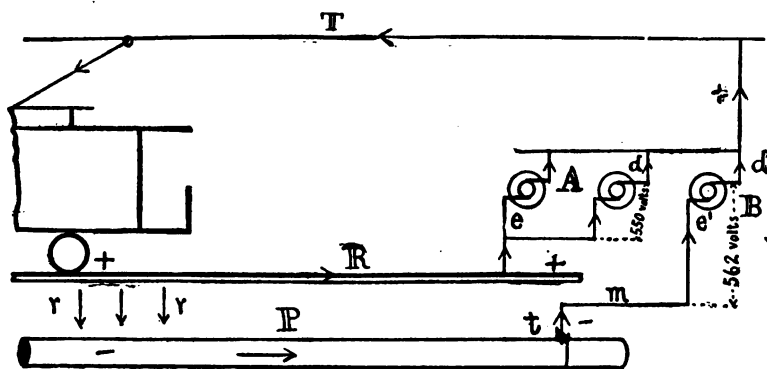


Fig. 2.

nies. They agreed that it would protect the pipes, but feared that it would waste considerable motive power. It was tested late one night at the Boyd-street power-house of the Consolidated Traction Company, with a single wire leading to a point where the pipes were seven volts positive to the rails and were suffering badly. The instant the method was applied, the same point upon the pipes became three volts negative and the power-house load dropped sixty horse-power. As this power-house was heavily overloaded and had no spare boilers or engines, this experiment was reluctantly made, but the result led to the immediate adoption of the system. Mr. Geo. E. Talcott, chief engineer of the company, has recently written me that not only had the system entirely checked electrolysis, but that it had saved them three hundred horse-power in their smaller power-house alone.

This surprising result is an impressive object-lesson to railway managers who wish to cut down operating expenses and save future litigation

with the owners of the pipes. As shown in Fig. 2, the positive current is carried to the trolley-wire, but the negative terminal of one dynamo *B* is disconnected from the rail return-wire, and joined to a wire *m* leading to the points on the pipes which show the greatest amount of corrosion. The electrical pressure of this dynamo *B* is then increased until the pipes are made two or three volts negative to the rails at the points where they were previously positive. Since the positive poles of dynamos *A* and *B* are joined, this difference of pressure asserts itself by keeping the pipes more negative than the rails, and there can be no more corrosion of the pipes.

There is no difficulty in keeping the two sets of dynamos at just the proper difference of pressure to secure this result, and the railways will be eager enough to adopt the scheme when they realize that they can thus reduce their station-load about twenty per cent, for the work at present expended in the current's reaching, corroding, and leaving the pipes is entirely lost.

The method entirely checks electrolysis of the pipes unless around some poor joint on same. Such a joint can be detected by a low-reading volt-meter on the surface of the street and the action stopped by continuing the wire *m*, diminished in size, to a point beyond the poor joint. It is true that, as far as described, the tendency of this method is to slightly increase the current flow on the pipes, but this is only the first step.

The current reaches the pipes at *rr* near the ends of the railroad lines, and here a difference of fifteen or more volts has often been found, the rails being positive to the pipes. This difference causes a heavy flow through the pipes, and is caused by poor bonding between the rails and by insufficient rail feeder-wires, or by the fact that the network of pipes may lead directly to the power-house, while the line of rails may take a roundabout course. But with proper bonding the difference of pressure between rails and pipes at *rr* may be cut down to one or two volts, by carrying out from the higher pressure dynamo *B* a continuation of the wire *m* to the rail at *rr*. Then with proper feeder regulators in the wires *m*, the rails at *rr* and the pipes at *t* can be kept at nearly the same potential, and the current flow on the pipes thus cut down to a minimum.

However, even this scheme would not be permanent if the ordinary methods were used of making electrical connections with the pipes. Copper or brass plugs inserted into the pipes as contact plugs to which pipe feeder-wires are soldered cause a heavy loss by thermo-electric action of the current passing through them, and at the same time, as gas engineers know, set up a galvanic action of their own which will soon destroy the contact and ultimately puncture the pipe.

An iron band clamped on a lead ring around a pipe is also a bad form of contact and certain to rust even though covered with tape and cement. Four of such bands, each about three inches wide, on a twenty-eight-inch

gas-pipe directly in front of a large power-house in Buffalo, and soldered to copper wires aggregating a section of two square inches, leading to the negative terminal of the dynamo, still left the pipe six tenths of a volt positive to the rails. Two of the lead bands had been put on within six months, no acid was used in the soldering, and yet the lead was badly corroded and the pipe marked.

This shows plainly that the old scheme of connecting pipes to the negative pole of the dynamo gives but slight and temporary relief to the pipes, for electrolytic corrosion will take place when the pipes are even one hundredth of a volt positive. After several years of experiment at the Edison laboratory but one contact metal or alloy was found that on a steel rail or an iron pipe would prevent a film of iron-rust from penetrating between the surfaces and ruining the contact. This "plastic alloy," as it is called, in connection with Mr. Edison's simple process of amalgamating iron or steel, forms a perfect electrical "union" of the metal, instead of a mere mechanical contact; its resistance is negligible even with two thousand amperes, and it will neither rust nor break.

A few square inches on the top of the pipe are filed clean of paint or scale, and rubbed with a silvery metal compound invented by Mr. Edison, which at once turns any iron-rust into a pure metallic iron and amalgamates the surface.

Metallurgists have long considered impossible a stable iron amalgam, but it nevertheless exists, and is so permanent that neither water nor any re-agent which it will encounter under the streets can decompose or rust the iron surface beneath it.

A U-shaped bolt is then slipped under the pipe and a cast-iron yoke placed over it. The end of feeder-wire *m* has been brazed to a copper saddle one eighth of an inch thick, fitted between top of pipe and bottom of yoke. The center of the saddle on each side of the wire is cut away to form a receptacle into which, after the copper has been amalgamated, is placed the plastic alloy. The nuts are then tightened up and locked.

When a joint between iron and copper is thus prepared all of the contact resistance disappears, and the thermo-electric loss is much reduced. But when this alloy is used between iron or steel surfaces both contact resistance and thermo-electric loss are eliminated. It will give a comparative idea of the efficiency of these contacts to state that with a copper rod five eighths of an inch in diameter and thirty inches long, having an area of ten times its cross-section, in contact with a steel plate, with surfaces accurately fitted together and joined with great pressure, the loss in transmitting fifteen hundred amperes was 0.51 volts; the same with amalgamated surfaces and with the plastic alloy between steel and copper was 0.26 volts; with the plastic alloy between amalgamated surfaces of steel and steel it was but 0.09 volts.

Since these joints have remained underground for over five years with absolutely no deterioration, and since by the above method the pipes can

be maintained negative to the rails at any desired potential, and since the net result is a large saving to the railway, there seems to be no excuse for further destruction of pipes by electrolysis.

The President, Mr. G. H. Benzenberg, here resumed the chair.

THE PRESIDENT: Gentlemen, the Secretary has a number of resolutions which he wishes to read.

THE SECRETARY: I will read the following resolutions, presented by E. M. Schuengel, of Milwaukee:

Resolved, That we express our thanks to Mayor Caldwell and other city officials and the Committee of Arrangements for the perfect arrangements, courtesies, and hospitality shown during the Second Annual Convention of the American Society of Municipal Improvements.

Resolved, further, That we express our thanks to the press of Cincinnati for the interest taken in the proceedings of the convention.

It was moved and seconded that the resolutions be adopted. Motion carried unanimously.

THE SECRETARY: Also a resolution by the same gentleman, as follows:

Resolved, That the American Society of Municipal Improvements, in Cincinnati assembled, expresses its thanks to the Chamber of Commerce, Moerlein Brewing Company, proprietors of the Zoo Garden, Art Museum, Cincinnati Observatory, Bell Telephone Company, Cincinnati Street Railway Company, Mt. Auburn and Eden Park Street Railway Companies, the Sycamore Street Cable Railway Company, Cincinnati Inclined Plane Railway Company, Covington and Newport Railway Companies, and the Society of Natural History for the invitations extended and for the pleasant entertainment provided during its stay in the Queen City of the West.

THE PRESIDENT: Gentlemen, the resolution is subject to amendment if anybody has been left out.

On motion, the resolution was adopted.

THE PRESIDENT: Gentlemen, we have some little business to transact yet. According to the constitution, a Finance Committee is to be elected. With your permission I would nominate for such committee the following gentlemen: L. W. Rundlett, of St. Paul, Minn.; F. G. O'Brien, of Oswego, N. Y.; and W. H. Glore, of Covington, Ky.; and, unless you have some other nominations to make, would suggest that somebody move that the Secretary cast the ballot for these gentlemen.

MR. JOHNSON, New Haven: I move that the Secretary cast the ballot for the gentlemen named as members of the committee.

Upon motion, the above-named gentlemen were elected as the Finance Committee.

THE PRESIDENT: I have named the chairmen of the various committees, and in as many cases as I could have consulted with them as to the make-up of the balance of the committee. Some of the chairmen I could not find; so I have been arbitrary again and added the other two names; all of which, however, is subject to your approval.

On Street-Paving—Messrs. A. D. Thompson, of Peoria, Ill.; Nelson P. Lewis, of Brooklyn, N. Y.; S. J. Hathaway, of Marietta, O.

On Electric Street-Lighting—Messrs. J. A. Cabot, of Cincinnati, O.; Harold P. Brown, of Newark, N. J.; F. W. Cappelen, of Minneapolis, Minn.

On Sewerage and Sanitation—Messrs. R. E. McMath, of St. Louis, Mo.; G. L. Clausen, of Chicago, Ill.; Geo. N. Fernald, of Portland, Oregon.

On Waterworks and Water-Supply—Messrs. H. Van Dyne, of Newark, N. J.; E. H. Keating, of Toronto, Can.; S. C. Hathaway, of New Bedford, Mass.

On Taxation and Assessment—Messrs. G. F. Munro, of Omaha, Neb.; Thos. DeVilbiss, of Ft. Wayne, Ind.; Chas. P. Sayres, of Camden, N. J.

On City Government and Legislation—Messrs. D. E. Wright, of Cleveland, O.; C. C. Brown, of Indianapolis, Ind.; G. McConkey, of Harrisburg, Pa.

On Disposition of Garbage—Messrs. John S. O'Shea, of Buffalo, N. Y.; Lyman H. Johnson, of New Haven, Conn.; Dr. J. W. Prendergast, of Cincinnati, O.

What is your pleasure as to these committees?

On motion, the rules were suspended, and the Secretary empowered to cast the ballot for the gentlemen of the different committees.

MR. LEWIS, Brooklyn, N. Y.: I do not know whether the subject of street-cleaning has been specially mentioned, or whether it can be considered as a subdivision of sanitation; but do you not think it would be well, gentlemen, to include in it both the subjects of street-cleaning and the collection and disposal of garbage?

THE PRESIDENT: Are you ready for the question? All those in favor will manifest it by saying aye. [Motion carried unanimously.]

I wish to say, gentlemen, that if I have made any errors in the selection you will pardon me, because I am not sufficiently familiar with your specialties. In the selection of the committees I have done the best I could. [Applause.] Is there any further business to be brought before the convention at this time?

MR. O'BRIEN: I would like to hear a list of the delegates read who paid their dues and the cities which belong to the association.

Motion seconded.

THE PRESIDENT: There are one hundred and three here who have paid.

MR. MUNRO: I want to correct a statement. I made a statement in regard to the temperature in the pavement. I do not want the members to understand that that was our normal temperature, but it was taken from the pavement in the sun, and not the temperature taken from the shade, because we do not claim as high a temperature as Cincinnati. [Laughter.]

MR. O'SHEA: I would suggest that some action be taken in reference to the remarks of the representative from Brooklyn in regard to street-cleaning. Something should be done looking toward a wider discussion of this very important question. It is one that is coming to the front in all the larger cities of the country, and is receiving some considerable attention in the smaller cities. The vicissitudes of cities like New York, Chicago, and other large cities in getting the streets cleaned should warrant the appointment of a committee to decide the best methods of cleaning streets; it is very closely connected with the sanitary condition and with the healthfulness of the city, and heretofore it has received very slight consideration on the part of the people. In New York they perhaps have tried far greater things in reference to street-cleaning than in any other city. The Kinnicut law, which was passed some years ago through the efforts of Mrs. Kinnicut, was most radical. It absolutely prohibited the use of machines on the streets in the city of New York, and one of the charges made by the City Club against Mr. G. S. Brennan, Commissioner of Street-cleaning, was that he violated the Kinnicut law in employing rotary sweepers. Mr. Waring violates the law in this respect just as much as Mr. Brennan did, and very properly I think. I merely want to show you the extreme to which people will go to get clean streets, and I think it would be proper to appoint a committee, and get men to serve who are familiar with the subject; if not now,

later; but let them go into the question thoroughly, and try next year to make a report that will be of interest and benefit to all those who belong to the society.

DR. HESS: I make a motion that a special committee of three be appointed on street-cleaning.

THE PRESIDENT: It is moved that a special committee on street-cleaning be appointed.

MR. LEWIS: I am still of the opinion, sir, that the Committee on the Disposition of Garbage, especially Mr. O'Shea of that committee, can handle the subject of street-cleaning. I think Mr. O'Shea is better posted than anybody in this convention, and I would be very sorry to have him feel that he could not take the consideration of it together with that of the garbage. I am sure he has manifested his familiarity with the subject as no one else has, and it seems to me that the subjects are so closely allied that they had better remain in the same committees.

MR. MUNRO: From the remarks made by the gentleman from Buffalo, I think he has made a deep study of the subject, and I move that we add two more members to the committee; but I certainly will be in favor of adding his committee on account of the labor, and it is no small matter, as it takes a great deal of labor and a great deal of time; so that therefore I would be opposed to this motion of appointing a special committee to attend to this matter. I amend the motion that two more members be added to the Committee on the Disposition of Garbage, of which Mr. O'Shea is chairman, and that street-cleaning be added to that committee.

THE PRESIDENT: Gentlemen, you have heard the amendment. Are you ready for the question?

MR. O'SHEA: I hope the gentleman who has made the amendment will recall it. Please do not add any more members to the committee. My experience is that large committees are apt to do very little work. I think, if you are going to decide that one committee should handle the subject, let it remain at three.

MR. MUNRO: With the consent of my second, I will withdraw my amendment.

THE PRESIDENT: The motion is that the subject of street-cleaning be added to the disposition of the garbage. [Motion carried.] I just received word from Mr. Herrmann, who wishes to remind the members of the society that the annual banquet is fixed at 7:30 sharp, at

the Gibson House, this evening. As something may come up that would require the attention of the society, and as I understand that the displays are not to take place until half-past three, I would suggest that we adjourn until 2 o'clock, so that any thing which may come up can be disposed of at that time.

Upon motion, the society then adjourned till 2 o'clock.

Friday, September 13th—Afternoon.

Meeting called to order at 2 : 30 P. M. by President Benzenberg.

THE PRESIDENT: There is a very important matter that should be attended to, and that is in regard to the printing of the Proceedings of this Convention. Some authority should be vested in the Executive Committee to contract for the printing of the proceedings, papers, and the discussions thereon in full, and have the same distributed to the actual members of the society.

MR. DEVILBISS: I would move you that the Executive Committee be instructed to have the proceedings of this meeting printed in pamphlet form, and that the Secretary distribute them to the members.

Motion seconded.

MR. JOHNSON: I would inquire whether the proceedings of the Buffalo meeting have been printed.

THE PRESIDENT: They have been printed, and are in the hands of the Executive Committee.

MR. JOHNSON: I would move you then that the proceedings of the Buffalo meeting should also be included in the printing of the proceedings of this meeting.

THE PRESIDENT: You have heard the motion as amended. Are you ready for the question? All you who are in favor of the amendment will give their consent by saying aye. [Carried.] There is another matter which requires attention. There has been a small card, which was kindly prepared by the local committee, given to the members as a certificate of membership. While the membership at this time in this society may not be considered of much value, yet in the near future the membership of this society will become of considerable value, and those who possess those cards will prize them. It might be well therefore to have a suitable card or "Certificate of

Membership" prepared, and the Secretary should send one to every member of the society.

MR. JOHNSON: I would move you that the Secretary be authorized to prepare a "Certificate of Membership," and send one to every member of this society.

THE PRESIDENT: You have heard the motion. All those who are in favor of it will manifest it by saying aye. [Carried.]

MR. WRIGHT: In consideration of the fact that the Secretary will have a lot of work to do during the coming year, I would like to offer the following resolution:

Resolved, That the Finance Committee be authorized to pay the sum of one hundred dollars for the services of the Secretary during the ensuing year.

I move that it be adopted.

THE PRESIDENT: You have heard the motion. Are you ready for the question? All you who are in favor of the question will manifest it by saying aye. [Carried.]

MR. WRIGHT: I would also like to offer the following resolution:

Resolved, That the Secretary be requested to express to the citizens of Nashville, Indianapolis, and Chicago the hearty thanks of the members of this society for the kindly invitations extended to them to hold the next annual meeting in their respective cities.

THE PRESIDENT: You have heard the motion. Are you ready for the question? All you who are in favor of the same will manifest it by saying aye. [Carried.]

MR. CAPPELEN: I would like to know the financial condition of this society at the present time. If we are to get up a very expensive lithographed card, I do not think that we will be able to pay for it, and I think that the members ought to pay whatever the cost might be in getting up these certificates of membership.

THE PRESIDENT: In response to your inquiry, Mr. Cappelen, I wish to say that the expense of the certificate will be according to the financial condition of the society. If they can not be lithographed, they can be printed. Possibly they can have them lithographed with a suitable cut, emblematic of the objects of the society, in the center.

THE SECRETARY: A suggestion that I was going to make, Mr. Chairman: I think that it is well to have some suggestions in regard

to getting up a coat-of-arms and insignia, or whatever you might call it, to represent this society. Now, every year we have a different kind of badge. So far we have been in two cities, and we have had a different kind of badge each time, and while the badges are pretty, at the same time, it seems to me, we should have some well-regulated coat-of-arms, of such shape and form as would look very nicely in the certificate of membership.

DR. HESS: I would move that the matter of a permanent badge for our society be left in the hands of our Executive Committee, with power to act.

THE PRESIDENT: You have heard the motion, that the matter of preparing a suitable badge or seal be left to the Executive Committee, to be submitted to the society at its next meeting.

DR. HESS: With power to act.

THE PRESIDENT: Gentlemen, allow me to say a few words in regard to that. There has been a great deal of feeling among the membership of various societies—I know this through my connections with a number of them—as to the proper badge, seal, or emblem which should signify or indicate the objects of this society. Now, undoubtedly, there is a diversity of opinions upon that subject, and the Executive Committee might not come within a gunshot of what the membership of the society would think is proper and suitable for the purpose. I would, therefore, suggest that perhaps the Executive Committee submit something at the next meeting. We are not going to suffer very much the ensuing year for the want of a badge or seal, except in the certificate, which need not perhaps be that same design. It seems to me that the society ought to have a voice in the matter.

DR. HESS: Exactly so, Mr. President. The membership of this society is not composed of boys. This society is composed of a membership representing the intellectualities of the different cities of the United States. The Executive Committee are men chosen from among the best of our members, and we certainly should be able to intrust such a small matter as that in their hands. I call for the question. [Applause.]

MR. CAPPELEN: I offer an amendment, that the Secretary of the committee be instructed to report at the next meeting of the association.

THE PRESIDENT: You have heard the amendment, that the matter

be referred to this society at the next convention. [Amendment lost.] The question is now upon the original motion. All those in favor of the original motion will manifest it by saying aye. [Motion carried.] I do not see any of the Chicago representatives here; there are none present. I shall try, gentlemen, to impress upon the local Committee of Arrangements at Chicago that this association convenes annually more for the purpose of transacting business than for pleasure [applause], and I shall endeavor to have the Committee of Arrangements appointed before our proceedings are printed, so that it will appear in the printed proceedings, and I shall reserve the right, unless you object, to revise, if necessary, the programme of the Committee of Arrangements at Chicago. I do this upon my own convictions as to the duties of this society toward its members, and upon the general opinion of the members as it has been expressed. This meeting, of course, has not been a strictly instructive business meeting. It has been more for the purpose of perfecting the organization and getting in proper line for the course hereafter to be pursued. That object, I think, has been thoroughly accomplished, and let us hereafter attend to business, and take in the pleasure just so far as is necessary to make the business agreeable and pleasant. [Applause.]

On motion of Mr. Cappelen, the society then adjourned *sine die*.

Friday, September 13th—Afternoon.

At 4 o'clock P. M. the delegates were entertained with a joint display of the Cincinnati Police and Fire departments.

The Committee of Arrangements had erected for the occasion a grand-stand against the center of the postoffice in Government Square, and when the entertainment began it was crowded to its utmost capacity with delegates and fair ladies. The windows of all the surrounding houses, including the Government Building, were filled with people, and the streets were crowded. It was all the police could do to keep the crowd back. It is estimated that fifty thousand people witnessed the exhibition.

Seated in the front and center of the grand-stand were Mayor Caldwell, President G. H. Benzenberg of the society, President August Herrmann of the Board of Administration, and other prominent officials. Promptly at 4:01 o'clock President Benzenberg pressed an electric

button near him, and an alarm was turned in from Box 586, which is the box located at the corner of Fifth Street and Lodge Alley. An immense crowd of people had congregated in front of the Gifts engine-house on Sixth Street, near Vine, to see the Threes make the run. As the first stroke of the alarm sounded and the joker dropped the horses jumped forward, and in charge of Captain Wharty the company started for the scene.

They reached Fifth and Walnut streets in just one minute, and five seconds later, amid the tumultuous cheers of the assembled thousands, had a giant stream of water sweeping high in the air and over the street toward the east. It was one of the quickest runs on record, and was made under ordinary conditions, the engine not leaving the house until the joker fell. Hook-and-Ladder No. 1 made the run with the Threes, and in seventy seconds after reaching the scene had the big ladder raised against the building at No. 111 East Fifth Street. This operation was greeted with cheers. The next engine to arrive after the Threes was the Tens, under command of Captain O'Neill. They threw the second stream of water, and the two streams, approaching each other from opposite directions, formed a glorious rainbow and made an impressive scene. The remainder of the companies which responded to the first alarm were the Fours, Nines, Fourteens, Sevens, and Hooks 7 and 2.

Chief Archibald was on the scene a minute after the first alarm had been rung, and arrived simultaneously with the Salvage Corps. On his arrival he jumped from his buggy and hastened to the grandstand, where he turned in the famous "ten blows." The following companies responded quickly: Twos, Fives, Eights, Thirteens, Twenty-twos, and Sixes. For several minutes the engines kept throwing streams, and all the trucks raised their ladders.

On the heels of the Fire Department came the police and patrol-wagons in charge of Chief Deitsch. Then a realistic scene of fighting a big fire was exhibited. From the top of a five-story building dummies were thrown out and were caught in life-saving nets handled by officers in charge of Lieutenant Poppe.

Engines 3 and 14 gave an exhibition of a Siamese stream, and pumped a stream of water from Walnut Street to Main. Following this the members of Engine Company No. 10 mounted the ladder of Hooks 2 and gave an exhibition of a water-tower.

There was a wait of some time after this exhibition, and then the music of the Bellstedt-Ballenberg Band announced the approach of both departments in review. The order of parade was as follows:

Sergeant Bedinger, in command of ten mounted Policemen.

Patrols 1, 2, 3, 4, 6, 7, 9, and 19.

Five Patrolmen, mounted on Bicycles.

Music.

Chief of Police Deitsch and his Staff, mounted.

Ten Companies of Police, in charge of their respective Lieutenants and Sergeants.

The marching was perfect, and the "finest" were greeted with a storm of applause.

Following the police came the Fire Department, as enumerated above, led by Chief Archibald and Marshal McAvoy. Their appearance was grand, and they were heartily cheered.

Friday, September 13th—Evening.

In the evening the delegates were entertained with a banquet furnished by the Committee of Arrangements. It took place at the Gibson House. Three immense tables stretched the entire length of the hall, and another table crossed them at the upper end.

Promptly at 7:30 o'clock the guests marched into the dining-room to the music of the Bellstedt-Ballenberg Orchestra.

At the upper end sat August Herrmann, Vice-president of the society; on his right was G. H. Benzenberg, President of the society; next to him sat Senator John Washburn, member of the local B. of A.; then came Second Vice-president William R. Kerr of the society, Third Vice-president James E. McGann, Secretary David L. Fulton, Treasurer John L. Kennedy. On the left of Vice-president Herrmann sat Mayor John A. Caldwell, member George Sterritt of the B. of A., Secretary Ollie Butterfield of the B. of A., and General Andrew Hickenlooper.

The banquet had barely begun when General David B. Henderson, congressman from Iowa, entered the hall, and was at once given a seat of honor beside Mayor Caldwell. The General was in the city to attend the meeting of the Army of the Tennessee.

The menu was superb. The menu-card was a pretty affair: the card proper had a cover of satin, upon which was printed the seal of the city and the words "Complimentary Banquet tendered to the American Society of Municipal Improvements by the Committee of Arrangements."

As soon as the banquet proper had been finished Mr. Herrmann introduced Mayor Caldwell, of Cincinnati, who spoke as follows:

MR. CHAIRMAN AND GENTLEMEN OF THE

AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS:

All I have to say to you will be to thank you for honoring the Queen City of the West with your presence at this convention. [Applause.] We sincerely trust that you know more of Cincinnati than you ever did, and that you may be able to speak a good word for the only Par.s of America.

Now, gentlemen, I have a very great pleasure to-night in having one of my associates in Congress step in this morning. You are members of municipal corporations; we have one of the brainiest, one of the most eloquent speakers, one of the greatest national leaders with us to-night. I take great pleasure in calling upon a hero of many battles and a statesman of national reputation, Hon. David C. Henderson, of Iowa, to say a few words to you. [Loud cheering and applause.]

Hon. D. C. Henderson spoke as follows:

MR. PRESIDENT AND GENTLEMEN:

It is true that I have held some public positions of trust, but occupy no such position as the gifted Mayor of Cincinnati represents. [Applause.] I have had one great misfortune in life; I have never held a city office under the American flag. [Laughter.] And when I see you sober-minded gentlemen, when I look into the faces, the pale faces, of the city fathers [laughter], and realize how much they can be trusted to represent the dignity and sobriety of a municipality, I regret exceedingly that I have not been one of you. [Laughter.]

Gentlemen of the convention, being a citizen of Iowa, the cold-water state, and a citizen of Dubuque, which is intensifiedly a cold-water city, I would not talk to this convention for a moment but for the fact that you are the state representatives of our city governments. But this much I desire to say, that I never was more impressed with the growing tendency of the times to drop all politics and run our city governments on independent lines. [Applause.] If any fellow here to-night has any politics, I think he do n't know it [laughter and applause]; for, judging from your actions, your bearings, and my feelings, we are all in it for the common good order. [Applause.]

But, gentlemen, I want to say one thing in all seriousness. In reading the papers to-night I see that your convention is grappling with great

questions that touch the interests of the American people and all of our great cities. You have been doing earnest brain-work at this convention. I noticed that in your papers read to-day you have been grasping questions like that of cremation, gathering garbage, and sewerage, which are some of the greatest and leading questions of to-day. You are throwing light on questions that are troubling every great municipality, and troubling the more our population increases. [Applause.] This convention in its annual gatherings can spread broadcast over this country light that is needed for the common welfare of the people. [Applause.] I wish you Godspeed, and I am glad that through the courtesy of the Mayor of Cincinnati, my old colleague and friend, I have had the pleasure of meeting you to-night, and adding one earnest word of encouragement. [Loud cheering and applause.]

The toast-master then called upon representatives of the various cities, and all made responses. The banquet closed with three ringing cheers for Cincinnati.

MEMBERS

OF THE

AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS

1895.

Akron, O	E. R. Harper.. ..	Mayor.
Allegheny, Pa.....	Wm. G. Wilkins.....	Sup't Eng. and Surveys.
“	David L. Fulton.....	Sup't Highways and Sewers.
Bridgeport, Conn	Frank E. Clark.....	Mayor.
“	Frank W. Beers.....	Board of Public Works.
Burlington, Ia.....	Wm. Steyh.....	City Engineer.
Buffalo, N. Y.....	Sam'l J. Fields.....	Chief Engineer.
“	J. S. O'Shea.....	Superintendent of Streets.
Brooklyn, N. Y	Nelson P. Lewis.....	Engineer Local Imp'ments.
Bloomington, Ill.....	W. P. Butler.....	City Engineer.
Camden, N. J.....	L. E. Farnham.....	“
“	Chas. P. Sayres.....	Chairman of Street Com.
“	John Blowe.....	Street Commissioner.
Chillicothe, O.....	C. C. Waddle	Mayor.
Chicago, Ill.....	W. D. Kent.	Commissioner Public Works.
“	Wm. R. Kerr.....	Commissioner of Health
“	L. B. Jackson.....	City Engineer.
“	G. L. Clausen.....	Sup't Bur. Sewers.
“	H. D. Patton.....	City Sealer.
Cincinnati, O.....	August Herrmann.....	Pres't Board of Adminis'n.
“	A. P. Butterfield....	Clerk Board of Adminis'n.
“	John Frey.....	Board of Administration.
“	Geo. T. Sterritt.....	“ “
“	John B. Washburn.....	“ “
“	Willis P. Tharp.....	Sup't and Eng. Waterworks.
“	H. J. Stanley.....	Chief Engineer.

Cincinnati, O.	J. W. Prendergast, M. D.	Health Officer.
"	Fred. Amthauer	Sup't of Street-Cleaning.
"	R. H. Warder	Superintendent of Parks.
"	Elliott Marfield	Purchasing Agent.
"	J. A. Cabot	City Electrician.
"	John Goetz, Jr.	Fire Commissioner.
"	W. T. Perkins	"
"	J. A. Archibald	Chief of Fire Department.
"	Ed. Bogen	Sup't of Infirmary.
"	B. Stanton, M. D.	State Board of Health.
Cleveland, O.	D. E. Wright	Director of Public Works.
"	J. L. Hess, M. D.	Health Officer.
"	W. K. Ricksecker	Superintendent of Infirmary.
Covington, Ky.	W. H. Glore	Superintendent of Waterworks.
Davenport, Ia.	E. W. Boynton	Commissioner of Public Works.
Dayton, O.	B. B. Childs	Trustee of Waterworks.
"	J. Linxweiler, Jr.	" "
"	R. T. McGregor	" "
"	Chas. E. Rowe	Clerk of Waterworks.
Dubuque, Ia.	W. H. Knowlton	City Engineer.
Fort Wayne, Ind.	Thos. D. DeVilbiss	Chairman Board of Public Works.
"	F. M. Randall	City Civil Engineer.
"	R. B. Rossington	Board of Public Safety.
Grand Rapids, Mich.	F. Letellier	Board of Public Works.
"	J. J. McVean	" "
"	L. C. Stowe	" "
"	H. A. Collar	City Engineer.
Hamilton, O.	L. A. Dillon	"
Harrisburg, Pa.	John McConkey	Highway Commissioner.
Indianapolis, Ind.	W. B. Holton	President Board of Public Works.
"	Chas. C. Brown	City Engineer.
Los Angeles, Cal.	C. S. Compton	"
Lima, O.	J. V. Smiley	Mayor.
"	R. H. Gamble	City Engineer.
Mansfield, O.	H. A. Sloan	President of Councils.
Marietta, O.	S. J. Hathaway	{ Vice-president of Councils, Member Street-paving Com.

American Society of Municipal Improvements. 137

Milwaukee, Wis	Geo. H. Benzenberg	President Board of Public Works.
"	E. M. Schuengel	Board of Public Works.
"	S. Brockman	" "
"	Fred. Schneider	" "
Minneapolis, Minn.	F. W. Cappelen	City Engineer.
Nashville, Tenn.	John L. Kennedy	Board of Public Works.
Newport, Ky.	John DeVere	Superintendent of Public Works.
"	John Surran	Superintendent of Waterworks.
New Haven, Conn.	L. H. Johnson	President Board of Public Works.
"	James Bishop	Com. Board of Public Works.
"	James N. States	" "
"	James E. McGann	" "
"	Nathan B. Hoyt	" "
"	C. W. Kelley	City Engineer.
"	Geo. L. Ives	Superintendent of Streets.
Newark, N. J.	Harrison Van Duyne	President Board of Public Works.
"	Abram Joralemon	Board of Public Works.
"	Henry E. Bailey	" "
Newark, N. J.	J. J. Burckhardt	Board of Public Works.
"	A. M. Linnette	Clerk Board of Public Works.
"	Ernest Adam	City Engineer.
"	Harold P. Brown	Electrical Engineer.
New Bedford, Mass.	S. C. Hathaway	Board of Public Works.
"	Chas. O. Brightman	" "
"	C. F. Lawton	Superintendent of Public Works.
"	W. F. Williams	City Engineer.
Omaha, Neb.	A. F. Munro	Chairman of Public Works.
"	F. J. Kasper	Member of Public Works.
Oswego, N. Y.	F. J. O'Brien	Superintendent of Public Works.
Parkersburg, W. Va.	R. H. Thomas	Mayor.
Portland, Me.	Geo. N. Fernald	City Engineer.
"	A. W. Smith	Secretary Park Com.
Peoria, Ill.	Will O. Clark	Com. Public Works.
"	A. D. Thompson	City Engineer.
Richmond, Ind.	Jos. C. Ratliff	Secretary Park Com.
Saginaw, Mich.	R. W. Roberts	City Engineer.
"	Robt. F. Johnson	City Clerk.

St. Louis, Mo. Robt. E. McMath. Pres't Board of Public Imp.
 " Frank L. Ridgely. Park Commissioner.
 Syracuse, N. Y. Henry C. Allen. City Engineer.
 " Robt. Ballard. President of Common Council.
 St. Paul, Minn. L. W. Rundlett. City Engineer.
 Toronto, Can. E. H. Keating. "
 Toledo, O. C. S. Brown. Water Commissioner.
 " T. R. Cook. Superintendent of Waterworks.
 Washington, D. C. Capt. L. H. Beach. Captain of Engineers, U. S. A.
 Williamsport, Pa. Geo. D. Snyder. City Engineer.
 Youngstown, O. F. M. Lillie. "
 " F. G. McConnell. City Commissioner.
 Concord, N. H. W. B. Howe. City Engineer.

I N D E X.

AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS:	PAGE
Origin of the society	3
<i>Second Annual Convention—</i>	
Preliminary arrangements	13-14
Opening address, Aug. Herrmann, Cincinnati, O.	14-15
Address of welcome, Mayor John A. Caldwell... ..	15-16
Response, G. H. Benzenberg, Milwaukee, Wis.	17
ANNUAL CONVENTION:	
Claims of cities for same	75-81
BADGE:	
Discussion as to same, and how to be provided for	127-128
CERTIFICATE OF MEMBERSHIP:	
Secretary authorized to prepare	127
COMMITTEES:	
<i>First Annual Convention —</i>	
Permanent organization	5
<i>Second Annual Convention —</i>	
Finance	12
Election and appointment of committees	122-123
Standing—Street-Paving	12
Electric Street-Lighting	12
Sewerage and Sanitation	12
Waterworks and Water-Supply	12
Taxation and Assessment	12
City Government and Legislation	12
Disposition of Garbage and Street-Cleaning	12
Report of Committee on Nominations and discussion ..	68-74

COMMUNICATIONS:	PAGE
Presented to Second Annual Convention.....	82
CONSTITUTION:	
<i>First Annual Convention —</i>	
As adopted	6
<i>Second Annual Convention —</i>	
As presented	18-21
Discussion of same.....	21-23
As adopted	37-40
Discussion of same.....	41-43
DELEGATES:	
First Annual Convention	4-5
ENTERTAINMENT	
<i>Second Annual Convention —</i>	
First day.....	34-37
Second day.....	68
Third day.....	129-131
Banquet.....	131-133
MEMBERS:	
List of, also state and city, and character of office	135-138
OFFICERS:	
For 1894-1895.....	2
For 1895-1896.....	12
Discussion as to time and manner of election.....	43-44
PAPERS:	
<i>First Annual Convention —</i>	
Purchasing Agencies, by Aug. Herrmann, President	
Board of Administration, Cincinnati, O.....	7-9
<i>Second Annual Convention —</i>	
Specifications for Vitrified Paving-brick, by W. S.	
Wilkins, C. E., Allegheny, Pa	24-29
Discussion of same.....	29-34
Quality of Public Water-Supply, by John W. Hill, C. E.,	
Cincinnati, O.	45-52
Discussion of same.....	52-55, 57-58

Index.

141

	PAGE
Water-Supply of Newark, by Henry E. Bailey, Commissioner of Public Works, Newark, N. J.....	55-57
Street and Sewer Work of Indianapolis, by W. B. Holton, Chairman Board of Public Works, Indianapolis, Ind.....	58-62
Discussion of same.....	62-65
General Government of Toronto, by Mr. Blevins, Toronto, Can.....	65-68
Collection and Disposal of Garbage, by Thos. D. DeVilbiss, Director Board of Public Works, Fort Wayne, Ind.....	83-86
Discussion of same.....	86-100
Street-Paving in Newark, by Harrison Van Duyne, President Board of Street and Water Commissioners, Newark, N. J.....	101-103
Discussion of same.....	103-106
School Hygiene, by Dr. Mary E. Donahue, Cincinnati, O.....	107-108
Street-Cleaning, Street-Watering, Scavenging, etc., by John Jones, Street Commissioner, Toronto, Can....	108-112
Discussion of same.....	112-115
Street-Cleaning in Newark, by H. E. Bailey, Commissioner, Newark, N. J.....	115
Electrolysis Prevention, by Harold P. Brown (New York), Consulting Electrical Engineer of the city of Newark, N. J.....	116-122
PRINTING:	
Of annual report; discussion as how to be done; Executive Committee empowered to print same	126-127
RESIGNATION:	
M. J. Murphy, President.....	23-24
RESOLUTIONS:	
Providing for appointment of special committee to report on disposition of garbage	100
Of thanks to Cincinnati officials.....	122
Of thanks to Cincinnati Chamber of Commerce, etc.....	122

STREET-CLEANING :	PAGE
Discussion as to appointment of committee.....	124-125
SECRETARY :	
Salary fixed	127
Directed to thank cities extending invitations for next annual meeting.....	127



